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Smoking and Health Bulletin

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Office on Smoking and Health

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ISSN: 0081-0363
JANUARY-FEBRUARY 1986
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CHEMISTRY

86–0001. El-Bayoumy, K.; O'Donnell, M.; Hecht, S.S. **On the Analysis of 1-Nitronaphthalene, 1-Nitropyrene and 6-Nitrochrysene in Cigarette Smoke.** *Carcinogenesis* 6(4):505-507, April 1985.

Methodology for analyzing 1-nitronaphthalene, 1-nitropyrene, and 6-nitrochrysene in mainstream cigarette smoke, using (^{14}C)1-nitronaphthalene, (^{14}C)1-nitropyrene, and (^{14}C)6-nitrochrysene as tracers and internal standards was developed and tested on domestic and foreign cigarettes. Cigarette smoke condensate was collected, and appropriate fractions containing labeled standards were obtained by a series of solvent partitions and column chromatography. Recovery of internal standards ranged from 60 to 70 percent. Fractions were analyzed by capillary gas chromatography with electron capture detection and by combined capillary gas chromatography—mass spectrometry. 1-Nitronaphthalene ($<$10 ng/cigarette), 1-nitropyrene ($<$10 ng/cigarette), and 6-nitrochrysene ($<$1 ng/cigarette) were not detected in mainstream smoke of the University of Kentucky 1R1 cigarette, a U.S. commercial 85 mm nonfilter cigarette, or a French commercial 70 mm nonfilter cigarette. (Auth. Abs. Mod.)

86–0002. Grunberg, N.E.; Morse, D.E.; Maycock, V.A., et al. **Changes in Overwrap and Butt Length of American Filter Cigarettes. An Influence on Reported Tar Yields.** *New York State Journal of Medicine* 85(7):310-312, July 1985.

Tar and nicotine yields of cigarettes, determined by official government assays and used by the public and by health professionals to evaluate and compare cigarette brands, have proved to be misleading in 18 percent of the 161 American brands examined. Reported tar yields and changes in physical characteristics (overwrap length and butt length) of 29 filter brands showed an inverse relationship, indicating that the reported tar yields may be inaccurate. Smokers can compensate for reduced tar and nicotine content of cigarettes by taking more puffs or by blocking ventilation holes, thereby self-administering substantially more tar and nicotine from each cigarette than official reports indicate. To improve the meaningfulness of the reported tar and nicotine yields, the number of puffs taken on each cigarette by smoking machines should also be included. (Auth. Abs. Mod.)

86–0003. Ohshima, H.; Nair, J.; Bourgade, M.-C., et al. **Identification and Occurrence of Two New *N*-Nitrosamino Acids in Tobacco Products: 3-(*N*-Nitroso-*N*-Methylamino) Propionic Acid and 4-(*N*-Nitroso-*N*-Methylamino) Butyric Acid.** *Cancer Letters* 26(2):153-162, March 1985.

Two new *N*-nitrosamino acids, 3-(*N*-nitroso-*N*-methylamino)propionic acid and 4-(*N*-nitroso-*N*-methylamino)butyric acid were isolated and identified in various types of tobacco, including snuff, chewing and pipe tobacco, cigars, and cigarettes. Levels ranged from 0.15 to 7.4 and 0 to 2.2 mg/kg of dry weight tobacco, respectively. For comparison, amounts of other *N*-nitrosamino acids such as *N*-nitrosoproline (NPRO) and tobacco-specific nitrosamines (TSNA) were determined in the same samples. Levels of *N*-nitrosamino acids were highly correlated with levels of TSNA. (Auth. Abs.)

86–0004. Rickert, W.S.; Robinson, J.C.; Bray, D.F., et al. **Characterization of Tobacco Products: A Comparative Study of the Tar, Nicotine, and Carbon Monoxide Yields of Cigars, Manufactured Cigarettes, and Cigarettes Made From Fine-Cut Tobacco.** *Preventive Medicine* 14(2):226-233, March 1985.

Tar, nicotine, and carbon monoxide yields of selected Canadian brands of manufactured and hand-rolled cigarettes and small and large cigars were compared. To control for varying volumes of smoke delivery, standardized comparisons were made in milligrams of toxic substance per liter of smoke. Mean deliveries of smoke and tar, nicotine, and carbon monoxide were highest for small cigars, followed by hand-rolled and manufactured cigarettes. Large cigars had the lowest yield per liter. However, the mean number of puffs varied from 108 for large cigars to 9.3 for manufactured cigarettes. Mean yields of tar per unit smoked were 38.1 for small cigars (standard error (SE) = 5.3), 17.5 (SE = 2.4) for large cigars, 21.1 (SE = 0.57) for hand-rolled cigarettes, and 9.4 (SE = 1.9) for manufactured cigarettes. Five out of six brands of cigarettes handmade from fine-cut tobacco delivered significantly more tar, nicotine, and carbon monoxide per cigarette or per liter than did the identically named manufactured brand. (Auth. Abs. Mod.)

PHARMACOLOGY AND TOXICOLOGY

86–0005. Abood, L.G.; Grassi, S.; Costanzo, M., et al. **Behavioral and Biochemical Studies in Rats After Chronic Exposure to Nicotine.** In: Sharp, C.W. (Editor). *Mechanisms of Tolerance and Dependence.* U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse, NIDA Research Monograph No. 54, 1984, pp. 348-355.

Chronic administration of nicotine in rats was used to study possible development of behavioral tolerance, effect on ^{3}H-nicotine binding in rat brain, binding affinity of rat hepatocytes for (—)- or (+)-^{3}H-nicotine, effect on metabolism of these stereoisomers by isolated hepatocytes, and the effect on lever press avoidance of aversive shock. Chronic infusion of nicotine into the fourth ventricle appeared to produce some tolerance to the nicotine-induced prostration syndrome; however, the tolerance vanished 3 days after the final dose. Chronic infusion into the lateral ventricle did not produce tolerance to nicotine administered directly into the fourth ventricle, and only slight tolerance was observed following chronic intraperitoneal nicotine administration. Some tolerance appeared to develop to the ability of nicotine to attenuate aversiveness to electric shock. This effect did not appear to be mediated by an opioid system. Chronic nicotine administration did not appear to alter either the affinity or density of ^{3}H-nicotine binding sites in rat brain or to increase its rate of metabolism by the liver. Specific, reversible, and nonstereoselective nicotine binding was observed in isolated hepatocytes. The relationship of binding affinity of the nicotine analogues coincided with their relative psychotropic potency.

86–0006. Abood, L.G.; Grassi, S.; Junig, J., et al. **Specific Binding and Metabolism of (—)- and (+)-(^{3}H)-Nicotine in Isolated Rat Hepatocytes and Hepatocyte Membranes.** *Archives Internationales de Pharmacodynamie et de Thérapie* 273(1):62-73, January 1985.

The specific binding of (—)- and (+)-(^{3}H)-nicotine and their relative rates of metabolism were investigated in isolated rat hepatocytes and hepatocyte membranes. A Scatchard plot of both (^{3}H)-enantiomers revealed two components, with the higher affinity site having K_d values of 2×10^{-10} and 3×10^{-9} mol and B_{max} values of 5×10^{-15} and 4×10^{-15} mol/mg protein for the (—)- and (+)-enantiomers, respectively. The lower affinity site for both enantiomers had a K_d of 4×10^{-9} mol and B_{max} of 5×10^{-14} mol/mg protein. Optimum pH for binding was in the higher range, in contrast with brain membranes where the optimum was 6.5, involving the protonated form of nicotine. A good correlation was observed between the pharmacologic potency of a group of nicotine analogues and their ability to bind to intact and hepatocyte membranes. The rate of conversion of nicotine to cotinine in hepatocytes is related to the degree of binding and accumulation. Results are discussed in terms of the possible relationship of nicotine binding and translocation to metabolism. (Auth. Abs. Mod.)

86–0007. Abood, L.G.; Grassi, S.; Noggle, H.D. **Comparison of the Binding of Optically Pure (—)- and (+)-(^{3}H)Nicotine to Rat Brain Membranes.** *Neurochemical Research* 10(2):259-267, February 1985.

High affinity binding with (+)-(^{3}H)nicotine was not demonstrated, suggesting that the ability of relatively low concentrations of (+)-nicotine to compete with (—)-(^{3}H)nicotine may be due to positive cooperativity. Only the (—)-enantiomer showed high affinity binding: specific binding of (+)-(^{3}H)nicotine could not be demonstrated until the pH was increased to 8.5. The (+)-nicotine was at least one-tenth as effective as (—)-nicotine in competition studies using (—)-(^{3}H)nicotine as the ligand in the optimal pH range of 6.0 to 7.5. Positive cooperativity was observed with (+)-(^{3}H)nicotine, but not until the pH reached 8.5. The absence of a higher affinity binding site for (+)-(^{3}H)nicotine may account for both the tenfold stereoselectivity of (—)-(^{3}H)nicotine and the difficulty in demonstrating (+)-(^{3}H)nicotine binding at a lower pH. It is concluded that the paradox is accounted for by a positive cooperativity in the binding of both (—)-nicotine and (—)-(^{3}H)nicotine to rat brain membranes in the presence of low concentrations of (+)-nicotine.

86–0008. Adams, J.D.; LaVoie, E.J.; Hoffmann, D. **On the Pharmacokinetics of Tobacco-Specific N-Nitrosamines in Fischer Rats.** *Carcinogenesis* 6(4):509-511, April 1985.

Analytical methodology developed for determining biological half-lives, rates of elimination, volume of distribution, and blood clearance of tobacco-specific N-nitrosamines (i.e., N'-nitrosonornicotine (NNN), N'-nitrosoanatabine (NAT), 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK), and 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol (NNAL)) in the F344 rat is described. Formation and persistence of an in vivo equilibrium between NNK and NNAL were also studied. The method consists of extraction and elution of nitrosamines through a Clin-Elut column with ethyl acetate, followed by concentration and analysis by a gas chromatography—thermal energy analyzer. Biological half-lives for NNN and NAT were 184 and 540 minutes, respectively, while those for NNK and NNAL ranged from 25 to 37 and 184 to 298 minutes, respectively. A relatively short biological half-life for tobacco-specific N-nitrosamines suggests a correlation with carcinogenic potency. (Auth. Abs. Mod.)

86–0009. Andersson, K.; Fuxe, K.; Eneroth, P., et al. **Effects of Acute Intermittent Exposure to Cigarette Smoke on Catecho-**

lamine Levels and Turnover in Various Types of Hypothalamic DA and NA Nerve Terminal Systems as Well as on the Secretion of Adenohypophyseal Hormones and Corticosterone. *Acta Physiologica Scandinavica* 124(2):277-285, June 1985.

Exposure to unfiltered cigarette smoke resulted in dose-dependent reductions in noradrenaline (NA) levels in various hypothalamic NA nerve terminal systems in Sprague-Dawley rats. Exposure also caused dose-dependent increases in amine turnover in various dopamine (DA) and NA nerve terminal systems in the hypothalamus. The effects of cigarette smoke inhalation on the function of central catecholamine (CA) neurons and secretion of hypophyseal hormones were investigated in male rats that were exposed to smoke from one, two, or four cigarettes to test for dose-dependent responses. Decreases in thyroid-stimulating hormone (TSH), luteinizing hormone (LH), and prolactin secretion were attributed to the ability of nicotine to activate lateral and medial tubero-infundibular DA neurons, independent of tyrosine hydroxylase inhibition. Unfiltered smoke also produced a dose-related increase in corticosterone secretion thought to be related to a smoke-induced increase in the facilitatory influence of paraventricular NA nerve terminals on corticotropin-releasing factor activity.

86–0010. Becker, C.G.; Hajjar, D.P.; Hefton, J.M. **Tobacco Constituents Are Mitogenic for Arterial Smooth-Muscle Cells.** *American Journal of Pathology* 120(1):1-5, July 1985.

Tobacco glycoprotein (TGP) purified from flue-cured tobacco leaves, tar-derived material (TAR), the water-soluble, nondialyzable, delipidized extract of cigarette smoke condensate, rutin-bovine serum albumin conjugates, quercetin, and chlorogenic acid are mitogenic for bovine aortic smooth-muscle cells, but not adventitial fibroblasts. Addition of unconjugated rutin to cultures of smooth-muscle cells did not significantly stimulate proliferation. However, adsorption of rutin to proteins in the culture medium enhanced its mitogenicity. Ellagic acid, another plant polyphenol, inhibited arterial smooth-muscle proliferation. Results suggest that a number of ubiquitous, plant-derived substances may influence smooth-muscle cell proliferation in the arterial wall. (Auth. Abs. Mod.)

86–0011. Bedran de Castro, M.T.B.; Downey, H.F.; Crystal, G.J., et al. **Effect of Controlled Ventilation on Renal and Splanchnic Blood Flows During Nicotine.** *American Journal of Physiology* 248(3, Part 2):H360-H365, March 1985.

The influence of free breathing (FB) vs. controlled ventilation (CV) (respiratory condition) and of anesthetic (pentobarbital (PA) vs. chloralose (CA)) on nicotine-induced vasomotor responses in the renal cortex and splanchnic beds of dogs was evaluated. Intravenous nicotine was administered to the following: group I, PA and CV; group II, PA and FB; group III, CA and CV; and group IV, CA and FB. Regional vascular conductances (VC) were calculated from regional blood flows measured with 15 μm radioactive microspheres. In group I, VC fell 22 percent in renal cortex and 52 percent in pancreas, increased in liver (hepatic arterial bed 130 percent), and did not change significantly in duodenum and spleen. In group III, VC fell to a greater extent in renal cortex, pancreas, duodenum, and spleen than in group I; VC in hepatic arterial bed did not change. In FB dogs (groups II and IV), nicotine caused marked hyperventilation, but decreases in VC in renal cortex, pancreas, and duodenum were similar to those in CV dogs. Results indicate that during intravenous infusion of nicotine (1) hyperventilation does not attenuate or reverse vasoconstriction in renal cortex, pancreas, or duodenum under either PA or CA, although it does in spleen under CA; (2) vasodilator mechanisms predominate over vasoconstrictor mechanisms in the hepatic arterial bed; and (3) vasoconstrictor responses in renal cortex, pancreas, duodenum, spleen, and liver are more pronounced under CA than under PA. (Auth. Abs. Mod.)

86–0012. Benowitz, N.L.; Jacob, P., III. **Nicotine Renal Excretion Rate Influences Nicotine Intake During Cigarette Smoking.** *Journal of Pharmacology and Experimental Therapeutics* 234(1):153-155, July 1985.

Data show that increasing nicotine elimination by acidification increases nicotine consumption from cigarette smoking. Eleven smokers were administered ammonium chloride or sodium bicarbonate throughout the day. Nicotine intake during unrestricted cigarette smoking was measured using metabolic clearance data obtained after i.v. nicotine infusion together with blood and urinary nicotine concentrations measured during 24-hour periods of cigarette smoking. Compared with placebo treatment (urine pH 5.6), urinary acidification (pH 4.5) increased renal clearance 208 percent and total clearance 41 percent while increasing urinary excretion of nicotine 7.2 mg/day. Urinary alkalinization to pH 6.7 resulted in a decrease in renal clearance with a small decrease in daily nicotine excretion. Average blood nicotine concentrations, which were similar in placebo and bicarbonate treatment conditions, were 15 percent lower during acid loading, while daily intake of nicotine was 18 percent higher. The compensatory increase in nicotine consumption was only partial, replacing about half the excess urinary nicotine loss. (Auth. Abs. Mod.)

86–0013. Benwell, M.E.M.; Balfour, D.J.K. **Nicotine Binding to Brain Tissue From Drug-Naive and Nicotine-Treated Rats.** *Journal of Pharmacy and Pharmacology* 37(6):405-409, June 1985.

Two nicotine binding sites with dissociation constants for nicotine of approximately 3 nm and 12 μm, respectively, were identified in homogenates of rat hippocampus, hypothalamus, parietal cortex, and mesencephalon. The greatest density of high affinity binding sites was in the parietal cortex (30.0±3.0 fmol/mg protein) and the lowest density was in the hypothalamus (16.1±1.0 fmol/mg protein). Density of low affinity sites was approximately 20 pmol/mg protein and did not show any regional variation. Neither site was present in medulla oblongata condensates. Accumulation of radioactivity following subcutaneous administration of (^{3}H)nicotine (0.4 mg/kg) was rapid, with the highest concentrations in brain regions with the highest density of high affinity binding sites. Medulla oblongata did not accumulate radioactivity above plasma concentrations. Chronic nicotine administration (0.4 mg/kg/day s.c. for 39 days) had no significant effects on (^{3}H)nicotine binding to brain tissue or its accumulation into brain. It is concluded that (1) nicotine readily passes from plasma into brain tissue and is accumulated in areas containing high affinity binding sites, and (2) biochemical and behavioral effects reported previously in response to chronic daily nicotine administration do not depend on changes in its uptake or binding by brain tissue. (Auth. Abs. Mod.)

86–0014. Berlin, M. **Low Level Benzene Exposure in Sweden: Effect on Blood Elements and Body Burden of Benzene.** *American Journal of Industrial Medicine* 7(5/6):365-373, 1985.

Previous research on benzene exposure has shown that smoking results in a large increase in benzene in exhaled breath. In various studies, measurements for benzene exposure were performed for different workplaces, breath benzene concentrations were measured in different occupations to establish toxicokinetics of benzene in man, and chromosomal aberrations in lymphocytes of exposed workers were examined. The smoke from one cigarette contains 60 to 80 μg benzene; exposure levels of 10 ppm are rather uncommon among workers handling gasoline or gasoline equipment. It was concluded that the gasoline load of road tankers cannot be responsible for chromosome changes in drivers, as milk truck drivers showed the same changes. Results did not prove that benzene was the cause of observed changes. Smoking is the confounding factor, with a potency of at least the same order of magnitude as benzene. In addition, present knowledge about the mechanisms of benzene metabolism is not sufficient to permit quantitative conclusions as to the human health risks. (Auth. Abs. Mod.)

86–0015. Birnbaum, L.S.; Johnson, L. **Disposition of Benzo(*f*)quinoline in Male Rats.** *Drug Metabolism and Disposition* 13(1):18-24, January-February 1985.

Absorption, distribution, metabolism, and excretion of ^{14}C-benzo(*f*)quinoline (BQ), an air pollutant and component of cigarette smoke, was studied in male Fischer 344 rats. BQ was completely absorbed after oral exposure to doses of from 1 to 100 mg/kg. Rats were treated intravenously with 1 mg/kg BQ and total radioactivity was examined at sacrifice (15 minutes to 3 days after dosing). BQ was rapidly distributed throughout the body and excreted in approximately equal amounts in urine and via bile into feces. Metabolism to several compounds more polar than BQ occurred prior to excretion. Most radioactivity in blood and half of that in liver was the result of metabolites of BQ, while only the parent compound could be detected in other tissues. No parent BQ was present in excreta. By 3 days after treatment, less than 2 percent of ^{14}C-BQ remained. Given the rapid metabolism and excretion of this compound, it is unlikely that repeated exposure to low doses would result in accumulation in the body. (Auth. Abs. Mod.)

86–0016. Brunnemann, K.D.; Scott, J.C.; Haley, N.J., et al. **Endogenous Formation of *N*-Nitrosoproline Upon Cigarette Smoke Inhalation.** In: O'Neill, I.K.; Von Borstel, R.C.; Miller, C.T., et al. (Editors). *N-Nitroso Compounds: Occurrence, Biological Effects and Relevance to Human Cancer,* IARC Scientific Publication No. 57. Geneva, International Association for Research on Cancer, 1984, pp. 819-828.

Documented endogenous N-nitrosation of proline occurring as a result of cigarette smoke inhalation may also apply to other N-nitrosatable amines, including nicotine, and thus lead to in vivo formation of carcinogenic N-nitrosamines. Endogenous N-nitrosation of amines in smokers was assayed by measuring urinary excretion of N-nitrosoproline (NPRO). Male smokers and nonsmokers were placed on a controlled diet that was low in proline and ascorbic acid. On days 1 to 3, volunteers received controlled diet alone (Group I); on days 4 to 6, diet was supplemented by a single daily dose of 300 mg proline (Group II); on days 7 to 9, diet was supplemented by a single daily dose of 1 g ascorbic acid followed by 300 mg proline (Group III); and for the last 3 days, a single daily dose of 1 g ascorbic acid was given (Group IV). Collections of 24-hour urine were made on days 3, 6, 9, and 12. Urine was analyzed for NPRO, creatinine, and cotinine. Mean 24-hour urinary NPRO excretion for 13 nonsmokers in Group I was 3.6 μg. NPRO excretion in 13 smokers was 5.9 μg/24 hours, significantly higher than that of nonsmokers ($p<0.05$). Urinary NPRO in 14 nonsmokers of Group II was significantly lower than that of 14 smokers ($p<0.05$). Group II smokers had reduced urinary levels of NPRO as a consequence of ascorbic acid intake. Differences in NPRO excretion by smokers and nonsmokers in Group IV were insignificant. Four nonsmokers exposed to passive smoke for 80 minutes three times/day did not exhibit elevated NPRO levels in 24-hour urine samples. (Auth. Abs. Mod.)

86–0017. Castonguay, A.; Tharp, R.; Hecht, S.S. **Kinetics of DNA Methylation by the Tobacco-Specific Carcinogen 4-(Methylnitrosamino)-1-(3-Pyridyl)-1-Butanone in F344 Rats.** In: O'Neill, I.K.; Von Borstel, R.C.; Miller, C.T., et al. (Editors). *N-Nitroso Compounds: Occurrence, Biological Effects and Relevance to Human Cancer,* IARC Scientific Publication No. 57. Geneva, International Association for Research on Cancer, 1984, pp. 805-810.

The tobacco-specific carcinogen, 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK), was injected intravenously (0.41 mmol/kg) into F344 rats. DNA from target organs (lung, liver) and a nontarget organ (kidney) was extracted, hydrolyzed, and analyzed for methylated guanines by cation-exchange high-performance liquid chromatography—fluorimetry. Levels of O^6-methylguanine and 7-methylguanine were three to eight times higher in the liver than in the lung. Neither base could be detected in the kidneys. The extent of methylation of hepatic

DNA by NNK was 35 times lower than previously observed with an equimolar dose of NDMA. Levels of the two methylated guanines in liver and lung DNA increased between 4 and 24 hours following NNK injection. Since NNK is metabolized rapidly in F344 rats to 4-(methylnitrosamino)-1-(3-pyridyl)-butan-1-01 (NNAl), the relatively slow methylation of hepatic DNA after injection of NNK could result from a slow release of methylating species from NNAl. This low but sustained level of O^6-methylguanine induced by NNK could, in part, explain its carcinogenic potency. (Auth. Abs. Mod.)

86–0018. Chowdhury, P.; Inoue, K.; Rayford, P.L. **Effect of Nicotine on Basal and Bombesin Stimulated Canine Plasma Levels of Gastrin, Cholecystokinin and Pancreatic Polypeptide.** *Peptides* 6(1):127-132, January-February 1985.

The influence of nicotine on basal and bombesin (BBS)-stimulated plasma levels of gastrin, cholecystokinin (CCK), and pancreatic polypeptide (PP) was investigated in six conscious dogs. Basal levels of gastrin, CCK, and PP were 28±5, 252±32, and 347±136 pg/mL, respectively. Values remained unchanged following intravenous infusion of 50 µg/kg-hr nicotine over a period of 90 minutes. Significant increases in gastrin, CCK, and PP levels were observed, however, following infusions of BBS alone or BBS in combination with nicotine. Gastrin levels were higher, whereas CCK and PP levels were lower after BBS infusion compared with BBS and nicotine. Peak values for CCK and PP, but not gastrin, were less during a second BBS infusion. Results indicate that nicotine, in the presence of bombesin, has an inhibitory effect on the release of gastrin and a stimulatory effect on the release of PP and CCK. Further research is recommended for elucidating the mechanism by which nicotine acts on the release and actions of CCK and PP. (Auth. Abs. Mod.)

86–0019. Costongs, G.M.P.J.; Janson, P.C.W.; Bas, B.M., et al. **Short-Term and Long-Term Intra-Individual Variations and Critical Differences of Clinical Chemical Laboratory Parameters.** *Journal of Clinical Chemistry and Clinical Biochemistry* 23(1):7-16, January 1985.

Twenty-eight clinical chemical blood parameters were studied with respect to intraindividual variations, particularly the influence of sex, smoking, and use of oral contraceptives. Both short-term variations (within 1 day and during 1 week), and long-term variations (during 6 months) were investigated in groups of 62, 16, and 274 individuals. Critical differences were calculated from total variations (i.e., physiological (personal) and analytical variations). No statistically or clinically significant differences were observed between male smokers and nonsmokers. However, statistically significant differences were observed between female smokers and nonsmokers for aspartate aminotransferase, lactate dehydrogenase, α-hydroxybutyrate dehydrogenase, alkaline phosphatase, and albumin. The differences in lactate dehydrogenase variation reached clinical significance. (Auth. Abs. Mod.)

86–0020. Crebelli, R.; Paoletti, A.; Falcone, E., et al. **Mutagenicity Studies in a Tyre Plant: In Vitro Activity of Workers' Urinary Concentrates and Raw Materials.** *British Journal of Industrial Medicine* 42(7):481-487, July 1985.

Analysis of urinary mutagenicity of rubber industry workers suggested a synergistic effect of smoking and occupational exposures. In vitro mutagenicity of various raw materials in use at a tire manufacturing plant and urine concentrates of 72 workmen (44 smokers) and 23 controls (16 smokers) were assayed with *Salmonella typhimurium* strains. Results show that smoking (but not occupation) was significantly related to appearance of urinary mutagenicity detectable with strain TA98. A possible synergistic effect of occupation and smoking was observed among tire builders who were also smokers. Three technical grade raw materials were weakly active as mutagens in strain TA98 in the absence (poly-p-dinitrosobenzene) or in the presence of metabolic activation (mixed diaryl-p-phenylendiamines and tetramethyltiuram disulphide). The latter chemical was also weakly active in strain TA100. (Auth. Abs. Mod.)

86–0021. Cundy, K.C.; Crooks, P.A.; Godin, C.S. **Remarkable Substrate-Inhibitor Properties of Nicotine Enantiomers Towards a Guinea Pig Lung Aromatic Azaheterocycle N-Methyltransferase.** *Biochemical and Biophysical Research Communications* 128(1):312-316, April 1985.

The kinetics of nicotine methylation by guinea pig lung homogenates was investigated. Interesting stereospecificity was observed for nicotine enantiomers. R-(+)-Nicotine is a substrate ($K_m = 1.42 \times 10^{-5}$M) for an SAM-dependent guinea pig lung aromatic azaheterocycle N-methyltransferase, whereas S-(—)-nicotine acts as a competitive inhibitor ($K_i = 6.25 \times 10^{-5}$M) of the N-methylation of its antipode. (Auth. Abs. Mod.)

86–0022. Cundy, K.C.; Sato, M.; Crooks, P.A. **Stereospecific *In Vivo N*-Methylation of Nicotine in the Guinea Pig.** *Drug Metabolism and Disposition* 13(2):175-185, March-April 1985.

Nicotine is stereospecifically biotransformed into an *N*methylated urinary metabolite in the guinea pig and *R*-(+)-(^{3}H-N'-CH_3)*N*-methylnicotinium ion has been identified as a urinary metabolite of *R*-(+)-(^{3}H-N'-CH_3)nicotine administered i.p. Under similar conditions, S-(-)-(^{3}H-N'-CH_3)nicotine is not converted to the corresponding *N*-methylated metabolite. *R*-(+)-*N*-methylnicotinium salt was isolated from urine of guinea pigs that had received chronic i.p. doses of *R*-(+)-nicotine. Identification and stereochemical analysis of this metabolite were carried out using analytical and preparative cation exchange high pressure liquid chromatography and chemical reduction followed by GLC-mass spectrometric analysis and ^{1}H NMR spectroscopy. (Auth. Abs. Mod.)

86–0023. Cuvelier, I.; Steinmetz, J.; Mikstacki, T., et al. **Variations in Total Phospholipids and High-Density Lipopro-**

tein Phospholipids in Plasma From a General Population: Reference Intervals and Influence of Xenobiotics. *Clinical Chemistry* 31(5):763-766, May 1985.

Tobacco had no effect on the concentration of phospholipids in plasma in a presumably healthy population of 2,000 persons (aged 4 to 70 years) in a study of the influence of various factors on concentrations of total phospholipids and high density lipoprotein (HDL) phospholipids in plasma. Alcohol consumption increased values for both total and HDL phospholipids, adjusted for age and sex. Measurement of phospholipids may be useful as an indication of cardiovascular disease, given the well-known "protective" effect of the HDL subfraction in this disease. Age is a major factor associated with variation of total phospholipids. In females, this is the result in part of age-related changes in hormonal status. Use of oral contraceptives affects only HDL phospholipid values. Determinations of phospholipids, cholesterol, and triglycerides are included in current screening for lipid status. (Auth. Abs. Mod.)

86–0024. Dahl, A.R.; Coslett, D.S.; Bond, J.A., et al. **Metabolism of Benzo(*a*)pyrene on the Nasal Mucosa of Syrian Hamsters: Comparison to Metabolism by Other Extrahepatic Tissues and Possible Role of Nasally Produced Metabolites in Carcinogenesis.** *Journal of the National Cancer Institute* 75(1):135-139, July 1985.

The formation of metabolites of nasally instilled benzo(*a*)pyrene (BaP) was determined in young adult male Syrian hamsters following reports that a high incidence of tumors occurred in tissues of the upper respiratory and alimentary tracts of hamsters exposed to BaP aerosols. Following nasal instillation of radiolabeled BaP aerosols in anesthetized hamsters (14 instillations at 2.6 nmol/instillation/nostril), material was collected from nasal and esophageal areas and analyzed for BaP and BaP metabolites. Approximately 50 percent of the instilled BaP was metabolized in the nose and, potentially, would have been swallowed in an awake animal. In auxiliary experiments, homogenates of respiratory and alimentary tissues were tested for metabolic activity for BaP. The nose, trachea, and lungs had about equally high activities on a per organ basis (5 to 7 nmol/hour), whereas all other tissues had considerably less activity. Results indicate that nasal metabolism may be important in causing tumors in alimentary and upper respiratory tissues. (Auth. Abs. Mod.)

86–0025. Dayer, J.-M.; Sundstrom, L.; Polla, B.S., et al. **Cultured Human Alveolar Macrophages From Smokers With Lung Cancer: Resolution of Factors That Stimulate Fibroblast Proliferation, Production of Collagenase, or Prostaglandin E_2.** *Journal of Leukocyte Biology* 37(5):641-649, May 1985.

Human alveolar macrophages from freshly excised lungs of smokers with bronchial cancer were examined. Crude culture media contained fibroblast proliferative activity and collagenase- and prostaglandin E_2-production-stimulating activity. Chromatographic analysis showed that the main peak of activity was located around 18 kilodaltons. Resolution of this peak by high performance liquid chromatography showed the presence of three distinct peaks, with quantitative and qualitative differences in biological activities, suggesting the presence of heterogeneous factors. (Auth. Abs. Mod.)

86–0026. Donahue, R.P.; Orchard, T.J.; Kuller, L.H., et al. **Lipids and Lipoproteins in a Young Adult Population. The Beaver County Lipid Study.** *American Journal of Epidemiology* 122(3):458-467, September 1985.

Cigarette smoking was inversely associated with serum levels of high density lipoprotein (HDL) cholesterol in men ($p<0.001$) and women ($p<0.001$), but positively related to serum triglyceride levels in both men and women ($p=0.05$ for men and $p<0.01$ for women). The 561 subjects (mean age 22 years) in a 9-year followup of the Beaver County (Pennsylvania) Lipid Study were originally participants in a countywide hypercholesterolemia screening program of seventh grade students during the 1972 to 1973 school year. Cigarette smoking was not significantly related to either total cholesterol or low density lipoprotein (LDL) cholesterol, although among men and among women not using oral contraceptives, smokers of more than one pack/day had lower concentrations of both total and LDL cholesterol. Results demonstrate that many of the relationships between lipid/lipoprotein concentrations and health-related behaviors seen in older adults are already apparent in young adulthood.

86–0027. Galeazzi, R.L.; Daenens, P.; Gugger, M. **Steady-State Concentration of Cotinine as a Measure of Nicotine-Intake by Smokers.** *European Journal of Clinical Pharmacology* 28(3):301-304, 1985.

Plasma cotinine, the major metabolite of nicotine, is used to determine nicotine intake in smokers since it has a much longer half-life than the mother substance and its plasma concentrations are less dependent on exact times of blood sampling. The linearity relationship between nicotine intake and cotinine level in plasma was studied in six healthy volunteers who received several i.v. doses of nicotine (≤ 480 µg/kg/day) for 4 days. Cotinine concentrations in plasma were linearly and directly related to nicotine intake. Concentration of cotinine showed little variation during and up to 2 hours after the last dose of nicotine. It is suggested that cotinine be used as an epidemiological marker of nicotine intake only if measured at the time the last cigarette of the day is smoked.

86–0028. Grech-Belanger, O.; Gilbert, M.; Turgeon, J., et al. **Effect of Cigarette Smoking on Mexiletine Kinetics.** *Clinical Pharmacology and Therapeutics* 37(6):638-643, June 1985.

In young adults, cigarette smoking significantly alters elimination of mexiletine, but has no effect on either absorption rate or volume of distribution. The effect of smoking on kinetics of a single, 200 mg oral dose of mexiletine (an antiarrhythmic drug) was investigated in 14 healthy university students (6 regular smokers (>15 cigarettes/day) and 8 nonsmokers) for a 2-year period. Mexiletine (1-(2,6-dimethylphenoxy)-2-aminopropane) is currently undergoing clinical investigation in North America. Elimination half-time was reduced from 11.1±3.4 to 7.2±1.8 hours; effect on clearance was less significant. Determination of urinary concentrations of three major metabolites of mexiletine (mexiletine glucuronide conjugate, hydroxymethylmexiletine, and *p*-hydroxymexiletine) indicated that cigarette smoking selectively induced conjugation of mexiletine with glucuronic acid and aliphatic hydroxylation to yield hydroxymethylmexiletine, but had no effect on formation of *p*-hydroxymexiletine. (Auth. Abs. Mod.)

86–0029. Henningfield, J.E., Miyasato, K.; Jasinski, D.R. **Abuse Liability and Pharmacodynamic Characteristics of Intravenous and Inhaled Nicotine.** *Journal of Pharmacology and Experimental Therapeutics* 234(1):1-12, July 1985.

The potential role of nicotine in tobacco dependence was investigated using the strategies of abuse liability assessment. Eight male volunteer cigarette smokers with histories of drug abuse were tested with three i.v. doses of nicotine (0.75, 1.5, and 3.0 mg/10 sec infusion) and placebo each test day, and with three doses of inhaled nicotine, in the form of research cigarette smoke (0.4, 1.4, and 2.9 mg estimated yield) and placebo (sham-smoking), given on alternate test days. Each subject was tested on 4 days with both routes of administration. Physiologic, subjective, and observer data were collected at intervals ranging from 15 seconds to 10 minutes beginning 10 minutes before drug administration and continuing for 30 minutes after administration. Both i.v. and inhaled nicotine produced dose-related increases in heart rate and blood pressure, and i.v. nicotine produced a transient bradycardia in four subjects during the first 30 seconds after drug administration. Skin temperature was decreased, but pupil diameter was not consistently changed. Ratings of drug dose "strength" and drug "liking" were directly related to dose level, whereas "desire to smoke cigarettes" was inversely related. Scores on the Morphine-Benzedrine Group (or Euphoria) scale of the Addiction Research Center Inventory were elevated by nicotine, and i.v. doses were identified frequently as cocaine. Signs and symptoms were similar for nicotine across the two routes of administration and included coughing, dizziness, nausea, and relaxed feelings. Nicotine shared the pharmacologic profile of prototypic drugs of abuse. The study supports the hypothesis that the role of nicotine in tobacco dependence is equivalent to the role of other psychoactive drugs in substance abuse. (Auth. Abs.)

86–0030. Herman, N.D.; Hunt, T.W.; Sheets, T.J. **Hand Harvester Exposure to Maleic Hydrazide (MH) in Flue-Cured Tobacco.** *Bulletin of Environmental Contamination and Toxicology* 34(4):469-475, April 1985.

Exposures of hand tobacco harvesters to maleic hydrazide (MH), a compound widely used to control lateral bud growth on tobacco and thought to be carcinogenic, were estimated following two 2-hour harvesting periods, one in July and one in August, performed 3 days after application of MH. Exposures were estimated by determining the contamination with MH of cellulose pads positioned in a respirator and on forearms, back, left and right rib areas, and thighs, and by analysis of hand rinses and urine samples. Residues of MH on green tobacco samples averaged 13 and 11 ppm, respectively, for the two harvest periods, representing levels of 91 and 69 ppm for flue-cured tobacco. Residues averaged over harvesters and body regions for each exposure period indicated the exposure rate was twice as high with wet tobacco (first harvest period) than with dry tobacco (second harvest period). Individual body regions having the highest exposure levels were the front of the neck, chest and stomach areas, forearms, and thighs. Respiratory exposure to MH averaged 4.8 and 3.3 µg/hour, respectively, for the two periods. Urine samples obtained immediately before exposure and 0 to 6, 6 to 24, and 24 to 48 hours after exposure contained 0.02 ppm MH (limit of detection) or less.

86–0031. Hook, V.Y.H.; Eiden, L.E. **(Met)enkephalin and Carboxypeptidase Processing Enzyme Are Co-Released From Chromaffin Cells by Cholinergic Stimulation.** *Biochemical and Biophysical Research Communications* 128(2):563-570, April 1985.

Experimental research indicates that nicotine stimulates release of a carboxypeptidase B-like enzyme involved in processing of proenkephalin in adrenal medulla. Also released is (Met)enkephalin pentapeptide from bovine chromaffin cells in primary culture. Hexamethonium, a nicotine receptor antagonist, blocked nicotine-induced release of the two substances. Data suggest that a highly active population of carboxypeptidase enzyme molecules was released from chromaffin cells by nicotine receptor stimulation. In tests, the ratio of enzyme activity/immunoreactivity for released carboxypeptidase secreted into cell culture by nicotinic stimulation was 10.1±1.02 pmol of (Met)enkaphalin/ng of carboxypeptidase immunoreactivity, while Co^{++}-stimulated carboxypeptidase in soluble and membrane components of purified chromaffin granules had ratios of 5.46±0.07 and 1.07±0.13, respectively. (Auth. Abs. Mod.)

86–0032. Horton, J.K.; Rosenior, J.C.; Bend, J.R., et al. **Quantitation of Benzo(*a*)pyrene Metabolite:DNA Adducts in Selected Hepatic and Pulmonary Cell Types Isolated From (^{3}H)Benzo(*a*)pyrene-Treated Rabbits.** *Cancer Research* 45(8):3477-3481, August 1985.

Benzo(*a*)pyrene (BaP) metabolite:DNA adducts were analyzed in hepatic and pulmonary cells isolated from rabbits 24 hours after i.v. administration of (^{3}H)BaP (1 mg/kg; 50 mCi/kg). The major adduct in each cell type analyzed was (+)-r-7,t-8-dihydroxy-t-9,10-oxy-7,8,9,10-(^{3}H)BaP:deoxyguanosine, but (±)-r-7,t-8-dihydroxy-c-9,10- oxy-7,8, 9, 10-(^{3}H)BaP:

deoxyguanosine and (—)-r-7,t-8-dihydroxy-t-9,10-oxy-7,8,9,10-(^{3}H)BaP:deoxyguanosine and an unidentified adduct were also observed. The level of the major adduct was similar in each of the isolated cell types and was at least as high in cells with very low cytochrome P-450-dependent monooxygenase activity (hepatic nonparenchymal cells and alveolar macrophages) as in those with higher activity (hepatocytes, alveolar type II cells, and Clara cells). The binding of BaP metabolites to proteins was also determined, and again binding levels did not correlate with differences in cytochrome P-450 activity. (Auth. Abs.)

86–0033. Iovino, M.; Monteleone, P.; Steardo, L. **Effect of Nicotine on Drinking and Diuresis in Septal Lesioned Rats.** *Physiology and Behavior* 34(2):307-309, February 1985.

Nicotine administration resulted in hyperdipsia and polyuria in rats given electrolytic lesions of septal nuclei. Water intake and urine output were measured before and after s.c. administration of nicotine tartrate (2.5 mg/kg) in septal-lesioned and sham-lesioned (control) male Wistar rats. In controls, nicotine caused a reduction in urine output about 30 minutes after administration (2.8 ± 0.3 vs. 3.5 ± 0.6 mL after 2 hours, $p < 0.02$) and inhibition in water intake in water-deprived animals (10.2 ± 1.2 vs. 18.9 ± 2.0 mL after 5 hours, $p < 0.001$). In the 70 percent of lesioned rats that became hyperdipsic and polyuric, nicotine administration increased water intake from 74.2 ± 1.8 to 129.8 ± 6.4 mL/day and urine output from 38.9 ± 1.8 to 101.6 ± 6.1 mL/day. A slow return to post-lesion baseline was observed when saline was substituted for nicotine. Administration of nicotine also significantly increased the mean ratio of water intake to diuresis.

86–0034. Janoff, A. **Elastase in Tissue Injury.** *Annual Review of Medicine* 36:207-216, 1985.

Cigarette smoking has been found to stimulate the synthesis and/or release of chemoattractants for polymorphonuclear neutrophils (PMN) and monocytes and bronchoalveolar lavage fluids of smokers contain higher levels of elastase activity than do those of nonsmokers. However, conflicting results have been obtained with regard to the effect of smoking on α_1-proteinase inhibitor functional activity in lung secretions. The role of elastase-mediated tissue injury in pulmonary diseases, including emphysema, and the effects of cigarette smoking are discussed in a survey on elastinolytic proteinases in man, excluding enzymes of the pancreas and digestive tract. Special emphasis is placed on elastase of PMN and properties of this latter enzyme, its target molecules in plasma and connective tissues, and its endogenous regulators are briefly discussed. Persistent activity of the enzyme, even in presence of regulatory inhibitors, is explained. (Auth. Abs. Mod.)

86–0035. Jeremy, J.Y.; Mikhailidis, D.P.; Dandona, P. **Cigarette Smoke Extracts Inhibit Prostacyclin Synthesis by the Rat Urinary Bladder.** *British Journal of Cancer* 51(6):837-842, June 1985.

Cigarette smoke extracts and condensates were found to inhibit in vitro prostacyclin (PGI_2) synthesis by rat bladder tissues. The influence of nicotine, cotinine, and other cigarette smoke components on in vitro PGI_2 secretion was investigated to elucidate the mechanism of cigarette smoke carcinogenesis in the bladder. Cigarette smoke extracts in Krebs-Ringer bicarbonate buffer or ethanol significantly inhibited PGI_2 secretion ($p < 0.002$), and responses were dose related. Concentrations of nicotine and cotinine up to 1 g/L did not have any inhibitory effects on PGI_2 secretion. Further experiments revealed that ethanolic cigarette smoke extracts inhibited conversion of ^{14}C arachidonic acid (^{14}C-AA) to 6-OXO-$PGF_1\alpha$ (the stable, spontaneous metabolite of PGI_2) at concentrations of 0.25 g/L and above, but nicotine and cotinine did not inhibit this conversion. Since both spontaneous PGI_2 release and the conversion of AA to PGI_2 were inhibited, it is likely that the action of smoke extracts is on the enzyme steps that are beyond phospholipase A_2, the enzyme that releases AA from membrane phospholipids. Inhibition of PGI_2 synthesis and secretion by cigarette smoke is thought to result in diminished urothelial cytoprotection, rendering the bladder more susceptible to carcinogens present in the urine.

86–0036. Jones, R.M. **Smoking Before Surgery: The Case for Stopping.** *British Medical Journal* 290(6484):1763-1764, June 1985.

Six weeks after cessation of smoking patients may expect improvement in pulmonary function, reduction in postoperative respiratory morbidity, and return to normal immune responses. Patients who cannot stop smoking will improve cardiovascular function by abstaining for 12 to 24 hours before surgery, particularly patients with ischemic heart disease. Components of cigarette smoke, such as carbon monoxide and nicotine, have immediate cardiovascular effects. Carbon monoxide reduces tissue oxygenation and has a weak negative inotropic action on the heart; nicotine causes an increase in heart rate and blood pressure. In combination, nicotine increases demand of the myocardium for oxygen, while carbon monoxide decreases the supply. Preoperative abstention will remove carbon monoxide and nicotine and improve cardiovascular fitness. Postoperative respiratory morbidity manifested in small airways disease, hypersecretion of mucus, and impairment of tracheobronchial clearance increased sixfold in patients who smoked > 10 cigarettes/day. Abstention from smoking for at least 6 weeks is required for beneficial results. The immune response is also affected by smoking through reduction in neutrophil chemotaxis, immunoglobulin concentrations, and natural killer cell activity. Pulmonary alveolar macrophages (a defense mechanism) are morphologically abnormal in smokers; after 6 weeks' abstinence, some aspects of the immune system will return to normal.

86–0037. Junge, B. **Changes in Serum Thiocyanate Concentration on Stopping Smoking.** *British Medical Journal* 291:22, July 1985.

Data on smoking obtained by questionnaire are increasingly being found to be insufficient, and more objective measures of true exposure to smoke are needed. Serum thiocyanate concentration, one of several variables used to substantiate the extent of tobacco smoke exposure in smokers, is used because of its comparatively long biological half-life (about 2 weeks), based on measurements of serial thiocyanate concentrations at fairly long intervals in only one person who had stopped smoking. For a more exact determination of its half-life and a more precise description of the concentration curve, thiocyanate was studied in six subjects who stopped smoking completely after 6 to 20 years. Mean biological half-life of thiocyanate was found to be considerably lower than the 14-day value determined in previous studies measuring thiocyanate concentration 1, 3, 4, 5, and 6 weeks after smoking cessation. These relatively long intervals between measurements, particularly during the first 3 weeks (and in only one subject), should be considered in assessing reliability of the longer value for half-life of thiocyanate. (Auth. Abs. Mod.)

86–0038. Kari, F.W.; Kauffman, F.C.; Thurman, R.G. **Effect of Bile Salts on Rates of Formation, Accumulation, and Export of Mutagenic Metabolites From Benzo(*a*)pyrene Produced by the Perfused Rat Liver.** *Cancer Research* 45(4):1621-1627, April 1985.

The effect of sodium taurocholate on the biliary export of stable mutagenic phenolic glucuronide metabolites of benzo(*a*)pyrene (BaP) from livers of corn oil- or 3-methylcholanthrene (3-MC)-treated rats was studied via a nonrecirculating perfusion system. Rates of export of mutagens produced from BaP (20 μM) into the bile were stimulated fivefold by the bile salt sodium taurocholate, concomitant with a twofold to threefold increase in bile flow. Steady-state rates of 60 and 90 revertants/g/hr were observed in bile when 20 μM BaP was infused into livers from rats treated with corn oil or 3-MC, respectively. Addition of taurocholate increased rates to 250 and 550 revertants/g/hr. In livers from 3-MC-treated rats, rates (8 min) of BaP phenol formation averaged 300 nmol/g/hr initially, but increased to 450 nmol/g/hr after 1 hour. The addition of taurocholate increased maximal rates of phenol efflux in the bile from 6 to 148 nmol/g/hr and decreased rates of phenol accumulation in intracellular stores from 342 to 220. Rates of efflux into the vena cava effluent averaged 120 nmol/g/hr and were not affected by taurocholate. Infusion of dehydrotaurocholate increased the appearance of BaP metabolites in the effluent perfusate but did not change rates of efflux into bile. Taurocholate doubled rates of metabolite output when bile flow was arrested by perfusion with calcium-free buffer. Thus, mutagenic glucuronides from BaP phenols accumulated in hepatocytes much faster than rates at which they were exported. Total rates of production by the liver were not affected by bile salts; however, taurocholate stimulated export into bile, while dehydrotaurocholate increased concentrations in the effluent perfusate. Both salts probably act by displacing metabolites from intracellular binding sites. (Auth. Abs. Mod.)

86–0039. Krokje, A.; Tiltnes, A.; Mylius, E., et al. **Testing for Mutagens in an Aluminium Plant. The Results of *Salmonella typhimurium* Tests on Expectorates From Exposed Workers.** *Mutation Research* 156(3):147-152, June 1985.

Results of mutagenicity assays suggest a synergistic effect from chemical exposure in an aluminum plant and cigarette smoking. Pooled expectorate samples from control nonsmokers and smokers did not produce a number of revertants significantly different from revertants in control solvent in either TA 98 + S9 or TA 100 + S9. Expectorate samples from nonsmoking workers in a Soderberg (Norway) potroom gave a positive response in both strains, but not sufficient for Ames' criteria of double that of control values. However, samples from smokers in the potroom produced a significantly mutagenic effect in both strains. The number of revertants was higher than the value for the control smokers ($p < 0.001$) and also higher than the value of control smokers and potroom-exposed nonsmokers combined, suggesting a synergistic effect.

86–0040. Ladd, K.F.; Archer, M.C.; Newmark, H.L. **Increased Endogenous Nitrosation in Smokers.** In: O'Neill, J.K.; Von Borstel, R.C.; Miller, C.T., et al. (Editors). *N-Nitroso Compounds: Occurrence, Biological Effects and Relevance to Human Cancer.* IARC Scientific Publication No. 57. Lyon, International Agency for Research on Cancer, 1984, pp. 811-817.

Endogenous nitrosation of proline by 16 smokers and 12 nonsmokers was significantly associated with salivary thiocyanate levels (correlation coefficient 0.49). Subjects consumed a volume of beetroot juice equivalent to 325 mg nitrate, and 1 hour later a saliva sample was collected for nitrite analysis and 500 mg proline was ingested. In a separate experiment, eight smokers and seven nonsmokers ingested only 500 mg proline. Urine samples were collected over the next 24 hours and analyzed for N-nitrosoproline. When proline only was ingested, there was no significant difference in urinary N-nitrosoproline excretion between smokers and nonsmokers. However, when beetroot juice and proline were consumed, smokers produced approximately 2.5 times as much N-nitrosoproline as nonsmokers. Salivary nitrite levels of smokers and nonsmokers before and after consumption of beetroot juice were not significantly different. However, salivary thiocyanate levels were approximately 3.2 times higher in smokers than in nonsmokers. Results suggest that the higher level of salivary thiocyanate in smokers is responsible for the increased rate of endogenous nitrosation of proline. Oxides of nitrogen in cigarette smoke do not appear to play a significant role. (Auth. Abs. Mod.)

86–0041. London, E.D.; Waller, S.B.; Wamsley, J.K. **Autoradiographic Localization of (^{3}H)Nicotine Binding Sites in the Rat Brain.** *Neuroscience Letters* 53(2):179-184, January 1985.

The regional distribution of high affinity (^{3}H)nicotine binding sites, visualized in the rat brain by light microscopic autoradiography, is described. Sites affected may relate to distribution of nicotine's cerebral loci of action. Density of binding sites was taken as the difference between total binding and nonspecific binding during incubation in the absence or presence of 1 mM unlabeled L-nicotine, respectively. Highest densities were observed in the interpeduncular nucleus and medial habenula; elevated levels were also noted in thalamic nuclei, areas related to sensory functions, the cerebral cortex, and molecular layer of the dentate gyrus. Low specific binding was observed in hypothalamus and caudate-putamen. No binding was detected in Ammon's horn of the hippocampus or in periaqueductal grey matter. (Auth. Abs. Mod.)

86–0042. MacLeod, M.C.; Tang, M. **Interactions of Benzo(*a*)pyrene Diol-Epoxides With Linear and Supercoiled DNA.** *Cancer Research* 45(1):51-56, January 1985.

To determine whether the major adduct formed by reaction of DNA with (±)-7r,8t-dihydroxy-9t,10t-oxy-7,8,9,10-tetrahydrobenzo(*a*)pyrene (BaPDE-1) is intercalated in the double helix, the reaction of BaPDE-1 with supercoiled and linear DNA was studied. The kinetics of DNA-catalyzed hydrolysis and of covalent binding are similar for the two DNAs; supercoiled DNA exhibits a 20 percent increase in the rate of hydrolysis of BaPDE-1 at low DNA concentration compared with linear DNA. Fluorescence excitation spectra and fluorescence quenching experiments provide no support for a model in which BaPDE-1 adducts are intercalated in supercoiled DNA. When deoxyribonucleoside adducts were analyzed by high performance liquid chromatography, identical distributions of BaPDE-1 adducts were found for supercoiled and linear DNA. Data are consistent with a previously proposed model in which the major BaPDE-1 adduct in both linear and supercoiled DNA exists in a conformation that allows stacking with the neighboring base pair and introduces a "kink" into the path of the helical axis, although there are undoubtedly other DNA adduct conformational models that are also consistent with the data. (Auth. Abs. Mod.)

86–0043. Mertzlufft, F.; Zander, R. **Normal Values of Oxygen Concentration in Human Blood.** *Advances in Experimental Medicine and Biology* 180:581-590, 1984.

Arterial oxygen (O$_2$) concentrations did not differ significantly between the 221 smokers (109 males and 112 females) and 234 nonsmokers (113 males and 121 females) studied, although smokers consistently showed higher hemoglobin (Hb) levels. O$_2$ values were measured with the O$_2$-Cuvette method: Hb concentrations were determined with the Alkaline Hematin D-575 procedure. In males, arterial O$_2$ concentrations varied between 16.84 and 24.50 percent (mean 20.33±1.45 percent). In females, the range was 15.30 to 22.91 percent (mean 18.58±1.59 percent). Average O$_2$ concentrations in smokers and nonsmokers were 20.36±1.63 and 20.39±1.59, respectively, in males and 18.54±1.60 and 18.60±1.58 percent, respectively, in females. Hb levels were higher in smokers, regardless of age and sex: 16.14±0.93 vs. 15.82±0.91 in males and 14.83±1.05 vs. 14.23±0.84 percent in females. Increasing age was associated with a continual but nonsignificant decrease in O$_2$ concentrations. No correlations were found between smoking, O$_2$ levels, and Broca index.

86–0044. Nielsen, H. **A Quantitative and Qualitative Study of Blood Monocytes in Smokers.** *European Journal of Respiratory Diseases* 66(5):327-332, May 1985.

Analysis of 82 subjects free of intercurrent or chronic disease indicated that smoking impairs blood monocyte microbicidal function. The effect of cigarette smoking on blood monocyte count and selected functions of isolated blood monocytes was studied in 41 smokers and 41 nonsmokers. Total leukocyte counts and monocyte counts were higher in smokers than in nonsmokers. In vitro functional studies of spontaneous migration, chemotactic responsiveness, and phagocytosis showed no correlation with smoking habits. However, intracellular killing of *Candida albicans* was significantly lower in blood monocytes of smokers compared with nonsmokers. Since blood monocytes are the precursors of tissue macrophages, the defective microbicidal function may represent an additional pathogenic factor in the diminished host defense observed in smokers. (Auth. Abs. Mod.)

86–0045. Nordberg, A.; Bergh, C. **Effect of Nicotine on Passive Avoidance Behaviour and Motoric Activity in Mice.** *Acta Pharmacologica et Toxicologica* 56(4):337-341, April 1985.

Low doses of nicotine increased motor activity and had a positive effect on learning/memory mechanisms in mice in a passive avoidance behavior study. Nicotine effects were tested by a T-maze model during both dark and light phases of the diurnal cycle. Low doses of nicotine (0.125 mg/kg to 0.250 mg/kg) increased motor activity during the day. During the dark phase, no stimulation was seen. A higher dose of nicotine (0.500 mg/kg) decreased motor activity during both dark and light phases. Although a positive effect on retention time was observed when mice were pretreated with 0.125 mg/kg nicotine, no significant effect was observed with 0.500 mg/kg nicotine. (Auth. Abs. Mod.)

86–0046. Nukina, I.; Ogawa, N.; Takayama, H., et al. **Binding Differences Between Nicotine and α-Bungarotoxin in the Rat Brain.** *Research Communications in Chemical Pathology and Pharmacology* 47(1):141-145, January 1985.

Radioreceptor assay (RAA) results in rat brain with ^{3}H-nicotine were compared with those obtained using ^{125}I-α-bungarotoxin (BTX). Scatchard analysis showed that the ^{3}H-nicotine binding site had an average Kd and Bmax of 5.31 nM and 0.047 pmol/mg protein, respectively, and that the corresponding ^{125}I-α-BTX binding site values were 0.092 nM and 0.044 pmol/mg protein. Cotinine, a nicotine metabolite that has a nicotine-like effect in vivo, inhibited ^{3}H-nicotine binding, but did not inhibit ^{125}I-α-BTX binding. Results suggest that ^{3}H-nicotine is a more useful ligand than ^{125}I-α-BTX for investigating the pharmacological action of nicotine in the brain. (Auth. Abs. Mod.)

86–0047. Overton, M.; Hickman, J.A.; Threadgill, M.D., et al. **The Generation of Potentially Toxic, Reactive Iminium Ions From the Oxidative Metabolism of Xenobiotic N-Alkyl Compounds.** *Biochemical Pharmacology* 34(12):2055-2061, June 1985.

Research has shown that reactive, electrophilic iminium ions may be generated by metabolism of a variety of N-alkylamines and N-alkylamides such as nicotine. Production of an iminium ion during metabolism may lead to a compound capable of reaction with DNA. Thus, compounds that have the potential to form iminium ions may be genotoxic. Nicotine, in metabolic incubations containing cyanide, forms 5′-hydroxynicotine, which yields 5′-cyanonicotine in a pathway involving an iminium ion. In freshly prepared acid or neutral solution, only the iminium ion is observed. However, in strongly alkaline solution only the carbinolamine is observed. At physiological pH, an estimated 75 percent or more was present as the iminium ion, supporting earlier conclusions that 5′-hydroxynicotine exists in equilibrium with the iminium ion. Subsequent studies showed that the iminium ion can be readily transformed into cotinine via a liver enzyme. Another route of nicotine metabolism is demethylation, but this route appears to be qualitatively less important. Other studies on cyanide, phencyclidine, N-methylcarbazole, N,N-dimethylaminoazobenzene, 4-cyano-N,N-dimethylaniline, hexamethylmelamine, carbinolamines, and carbinolamides are also summarized.

86–0048. Putman, D.L.; David, R.M.; Melhorn, J.M., et al. **Dose-Responsive Increase in Sister Chromatid Exchanges in Bone-Marrow Cells of Mice Exposed Nose-Only to Whole Cigarette Smoke.** *Mutation Research* 156(3):181-186, June 1985.

A dose—response increase in sister-chromatid exchanges (SCEs) was found in bone marrow cells of mice exposed to whole cigarette smoke. B6C3F1 mice were exposed nose-only to 10 percent cigarette smoke 5 days/week for 2 weeks. Four dose levels (1, 4, 9, and 18 exposures/day) were administered using two cigarette types (Kentucky reference 3A1 and American Blend (AB) cigarettes). A single exposure represented approximately one cigarette. None of the smoke exposure conditions had a significant effect on cell replication, but dose—response increases were observed in the frequency of SCEs/cell. Groups receiving 9 and 18 exposures/day showed a wider distribution of SCEs/cell and there was a generalized shift to higher numbers of SCEs/cell, but comparison of the four exposure groups showed that the variances were not equal. No significant differences in effects between the Kentucky and AB cigarettes were observed.

86–0049. Robertson, F.W.; Cumming, A.M. **Effects of Apoprotein E Polymorphism on Serum Lipoprotein Concentration.** *Arteriosclerosis* 5(3):283-292, May-June 1985.

Analysis of phenotype and lifestyle habits showed that cigarette smoking and alcohol use had minor, but suggestive, effects on serum lipoprotein concentrations. Serum concentrations for the cholesterol and triglyceride content of very low density lipoprotein (VLDL) and the cholesterol content of intermediate density lipoprotein (IDL), low density lipoprotein (LDL), and the high density lipoprotein fractions (HDL$_2$, HDL$_3$) were measured in 337 men and women (aged 45 to 60 years) with apo E phenotype. About half of the subjects were smokers (average consumption was 22.4 cigarettes/day for men and 16.7 cigarettes/day for women. LDL concentration of E-3/2 subjects compared with the commonest category (E-3/3) was about 20 percent lower in men and about 12 percent lower in women, in whom VLDL and IDL concentrations were substantially elevated. In E-4/3 women, serum LDL concentration was about 10 percent higher than in E-3/3 women, but other differences were minor. The effect of allelic substitutions differed between the sexes. The relations between C-peptide ratios and serum lipoprotein concentration differed by gender and phenotype. Smoking and drinking habits influenced serum lipoprotein only minimally: tobacco tended to diminish the HDL fraction, but alcohol tended to increase the HDL fraction. However, the partial regression coefficients suggested that phenotype E-3/2 women may be more sensitive to the effects of smoking than men and women of other phenotypes. (Auth. Abs. Mod.)

86–0050. Sasagawa, S.; Suzuki, K.; Sakatani, T., et al. **Effects of Nicotine on the Functions of Human Polymorphonuclear Leukocytes In Vitro.** *Journal of Leukocyte Biology* 37(5):493-502, May 1985.

Results indicate that although nicotine can impair the functions of polymorphonuclear leukocytes (PMN), it is not cytotoxic to PMN. Effects of nicotine on migration, extracellular release of lysosomal enzymes, and superoxide anion production of human PMN were investigated. Nicotine had no effect on random migration, chemotaxis to fMet-Leu-Phe, or on chemokinesis induced by fMet-Leu-Phe. However, it did inhibit extracellular release of lysosomal enzymes from PMN and superoxide anion production of PMN, both induced by fMet-Leu-Phe and cytochalasin B. Inhibition of enzyme release and superoxide anion production by nicotine was not affected by atropine, hexamethonium, or acetyl β-methylcholine, suggesting a direct action of nicotine on PMN functions. It is presumed that nicotine inhibits the microbicidal functions of PMN but does not affect PMN migration to inflammatory sites. Exposure of PMN to nicotine introduced into the body by smoking could suppress PMN functions, which might result in harmful influences on the host defense mechanism, including antitumor function. (Auth. Abs. Mod.)

86–0051. Schaefer, E.L.; Selkirk, J.K. **Metabolism of Benzo(*a*)pyrene by Variant Mouse Hepatoma Cells.** *Cancer Research* 45(8):3487-3492, August 1985.

Results indicate that subpopulations of cells, within a tissue or in a mass culture, may differ in metabolic activation capability and therefore susceptibility to transformation to a neoplastic state by a chemical carcinogen such as benzo(*a*)pyrene (BaP). Four mouse hepatoma cell lines (a parent and three variants) were incubated with BaP and the metabolites were analyzed by high pressure liquid chromatography. Hepa-1c1c7 (the parent cell line) and MUL12 metabolized BaP most rapidly and to the greatest extent, TAOc1Bp^{r}c1 had intermediate activity, and Bp^{r}c1 had the weakest. At low cell density, TAOc1Bp^{r}c1 resembled the weakly active Bp^{r}c1 in accumulating a low amount of ethylacetate-soluble metabolites while, at high cell density, TAOc1Bp^{r}c1 resembled the parent clone and the highly active variant MUL12. The parent and the two more actively metabolizing variants showed differences in peak times of accumulation of the 9,10-diol and the 7,8-diol of BaP, which may have implications for binding to DNA and nuclear proteins. It was concluded that BP^{r}c1 has basal but not easily inducible aryl hydrocarbon hydroxylase (AHH) activity, whereas Hepa-1c1c7, MUL12, and TAOc1Bp^{r}c1 have basal and inducible AHH activity. (Auth. Abs. Mod.)

86–0052. Sebti, S.M.; Pruess-Schwartz, D.; Baird, W.M. **Species- and Length of Exposure-Dependent Differences in the Benzo(*a*)pyrene:DNA Adducts Formed in Embryo Cell Cultures From Mice, Rats, and Hamsters.** *Cancer Research* 45(4):1594-1600, April 1985.

The activation of benzo(*a*)pyrene (BaP) to DNA-binding metabolites in early-passage embryo cell cultures prepared from various species of rodents was investigated by exposing cells from mice (BALB/c and Sencar), rats (Wistar and Fischer 344), and Syrian hamsters to (^{3}H)BaP for various lengths of time. BaP:DNA adducts containing *cis*-vicinal hydroxyl groups, such as those formed from 7β,8α-dihydroxy-9α,10α-epoxy-7,8,9,10-tetrahydroBaP (*anti*-BaPDE), were separated from the other types of BaP:DNA adducts by immobilized boronate chromatography, and individual adducts were analyzed by high-performance liquid chromatography. A number of BaP:DNA adducts were present in the DNA from cultures from all three species after 5 hours of BaP treatment. After a 24-hour exposure, mouse and hamster embryo cell DNA contained a large amount of the adduct formed by reaction of (+)-*anti*-BaPDE with the 2-amino group of deoxyguanosine (dGuo) and a small amount of a 7β,8α-dihydroxy-9β,10β-epoxy-7,8,9,10-tetrahydroBaP:dGuo adduct. A large number of BaP:DNA adducts derived from 7β,8α-dihydroxy-9β,10β-epoxy-7,8,9,10-tetrahydroBaP and other unidentified BaP metabolites were present in rat embryo cell cultures at all times. Neither the Fischer 344 nor the Wistar rat embryo cell cultures had a significant amount of (+)-*anti*-BaPDE:dGuo adduct after 5 hours of BaP treatment. In the Wistar rat cells, larger amounts of other adducts were present even after a 96-hour exposure to BaP. In cell cultures from all three species, the proportion of (+)-*anti*-BaPDE:dGuo adduct increased as length of exposure to BaP increased. (Auth. Abs. Mod.)

86–0053. Setlow, R.B.; Cao, E.H.; Delihas, N.C. **Enzymology of Repair of DNA Adducts Produced by *N*-Nitroso Compounds.** In: O'Neill, I.K.; Von Borstel, R.C.; Miller, C.T., et al. (Editors). *N-Nitroso Compounds: Occurrence, Biological Effects and Relevance to Human Cancer.* IARC Scientific Publication No. 57. Geneva, International Association for Research on Cancer, 1984, pp. 561-570.

Differences in constitutive levels of methyl-accepting activity in extracts of human lymphocytes and in acceptor activity in lung macrophages from smokers (low activity) and nonsmokers (high activity) have been observed. Cell strains and lines investigated can be catalogued into three classes: (1) high constitutive activity (30,000 to 100,000 acceptor sites/cell) and rapid adaptive response (several hours); (2) high constitutive activity and very slow adaptive response; and (3) low constitutive activity. Cytotoxicity of methylating agents is highest for the last class and lowest for the first class. Biological effects of DNA adducts depend on their nature, and on their half-lives relative to rates of DNA replication and transcription. Half-lives are determined by rates of spontaneous decay, such as depurination, and rates of enzymatic repair of adducts or their decay products. Principal modes of repair of methylating and ethylating agents are by glycosylase-catalyzed depurination of 7-alkylguanine and 3-alkyladenine and by dealkylation of O^6-alkylguanine. Latter repair is accomplished by transfer of the alkyl group to cysteine residues of acceptor proteins in a stoichiometric reaction. Repair by dealkylation cannot be detected by standard methods used to measure DNA repair, but acceptor activity in cell extracts is easily estimated by measuring transfer of radioactive O^6-alkyl groups in an exogenous DNA to protein. In extracts of cells treated with alkylating agents, activity is depressed because the endogenous DNA is rapidly dealkylated, using up acceptor activity. (Auth. Abs. Mod.)

86–0054. Sewell, R.G.; Nanry, K.P.; Kennedy, J., et al. **Supra-Additive Toxic Interaction of Nicotine With Antihistamines, and Enhancement by the Proconvulsant Pentylenetetrazole.** *Pharmacology, Biochemistry and Behavior* 22(3):469-477, March 1985.

Two experiments were undertaken to (1) analyze whether tripelennamine, an H$_1$-histamine receptor antagonist of the ethylene diamine class, interacts with nicotine to determine toxicological response in rats (number dead in each test group); (2) establish whether the aminoethyl ether diphenhydramine interacts with nicotine in a similar manner; and (3) analyze the possibility that convulsive seizures are causally related to a toxic synergism between nicotine and tripelennamine. Results revealed that over the dose ranges employed, nicotine (0.0, 2.0, 4.0, and 8.0 mg/kg) was completely nonlethal when given to adult female rats alone, tripelennamine (0.0, 16.0, 32.0, and 64.0 mg/kg) was virtually nonlethal, and diphenhydramine (0.0, 32.0, 64.0 mg/kg) was toxic only at the highest dose. Tripelennamine in combination with nicotine yielded a supra-additive interaction, with the degree of potentiation being a simple linear function of nicotine within each dose of tripelennamine. The interaction between nicotine and diphenhydramine was more complicated, with certain dose combinations yielding supra-additivity while others yielded antagonism. The proconvulsant pentylenetetrazole (PTZ; 0.0, 10.0, and 20.0 mg/kg) dramatically enhanced the degree of nicotine—tripelennamine toxic interaction at doses where each of the drugs given individually was totally nonlethal. Results suggest that clinically observable nicotine—antihistaminic interactions may occur at the behavioral level with lower dose ranges. (Auth. Abs. Mod.)

86–0055. Shah, A.S.; Sarode, A.V.; Bhide, S.V. **Experimental Studies on Mutagenic and Carcinogenic Effects of Tobacco Chewing.** *Journal of Cancer Research and Clinical Oncology* 109(3):203-207, May 1985.

Alcohol-extractable fractions of Indian chewing tobacco (Pandharpuri variety) were tested for mutagenicity in the Ames test with *Salmonella typhimurium* and in V79 Chinese hamster cells and for tumorigenicity in male Swiss mice. Twenty mice were given tobacco extract in food, 20 were given tobacco extract by gavage, and 20 were given nitrosopyrrolidine (NYPR) by gavage (for comparison). To determine the effects of pesticides, some mice were administered (gavage) tobacco extract with hexachlorocyclohexane (HCH). Tobacco extract showed frameshift-type mutagenicity and required metabolic activation in the Ames test. The extract was also mutagenic in V79 cells with and without S9 mixture, but mutagenicity was considerably enhanced in the presence of S9 mixture. Gavage administration of tobacco extract (1:50 dilution) produced tumors in 53 percent of surviving mice. A 1:25 dilution proved too toxic: only seven mice survived 18 weeks. Tumor incidence was 62.5 percent in mice given NYPR. Mice receiving dietary tobacco extract survived longer, and only 44 percent developed tumors. Tumor incidence was 4 percent in a control group given distilled water. HCH and tobacco extract showed an additive effect on tumor induction. Tumors were mostly lung papillary adenocarcinomas and hepatocellular carcinomas.

86–0056. Sopori, M.L.; Gairola, C.C.; DeLucia, A.J., et al. **Immune Responsiveness of Monkeys Exposed Chronically to Cigarette Smoke.** *Clinical Immunology and Immunopathology* 36(3):338-344, September 1985.

Spleen cells from animals subjected to a heavy dose of cigarette smoke demonstrated significant reduction in natural killer cell-mediated lytic activity and decreased response to concanavalin A. Eleven adult male stumptailed monkeys (*Macaca arctoides*) were exposed to either a low dose (human equivalent of one pack/day) or a high dose (human equivalent of three packs/day) of high-tar, high-nicotine University of Kentucky reference cigarette smoke for 4 to 8 years. Several parameters of immunological responses were compared with responses of six control animals. Results suggest that cigarette smoking may have a differential effect on lymphocyte subpopulations, and that the effects on the immune response are related to the dose of cigarette smoke. Also, cigarette smoking does not significantly affect the response of spleen cells to the mitogens phytohemagglutinin or lipopolysaccharide. (Auth. Abs.)

86–0057. Stenstrand, K. **Effects of Ionizing Radiation on Chromosome Aberrations, Sister Chromatid Exchanges and Micronuclei in Lymphocytes of Smokers and Nonsmokers.** *Hereditas* 102(1):71-76, 1985.

Incidence of chromosome aberrations and frequency of sister chromatid exchanges (SCEs) and micronuclei were studied in irradiated and unirradiated peripheral blood lymphocytes of 10 smokers (20 to 30 cigarettes/day) and 10 nonsmokers. Heparinized blood samples were collected and divided; one part was irradiated with a ^{60}Co gamma source and the other part remained unirradiated. No effect of smoking was observed in the number of chromosome aberrations, in either the irradiated or nonirradiated samples. Smokers had a higher mean frequency of SCEs in the unirradiated series (10.1 ± 1.8) compared with nonsmokers (8.1 ± 1.6, $p < 0.05$). Although no significant difference between the two groups was observed in the irradiated samples, the mean SCE frequency was slightly higher among the smokers (9.9 vs. 8.9, respectively). Smokers had significantly higher mean frequencies of micronuclei in both the unirradiated (6.3 ± 0.5 vs. 4.1 ± 0.4, respectively, $p < 0.025$) and irradiated samples (19.4 ± 0.8 vs. 15.8 ± 0.7, respectively, $p < 0.05$). However, a statistically significant synergistic effect between smoking and irradiation was not found.

86–0058. Taylor, A.W.J.; Edwards, C. **Theophylline and OTC Medicines.** *Pharmaceutical Journal* 234(6331):688-689, June 1985.

Theophylline is a potent bronchodilator commonly prescribed for reversible obstructive airways disease, such as asthma. In practice, dosing of theophylline should be titrated to serum concentration of individual patients. Blanket doses are inadvisable because metabolism of the drug varies considerably between patients, and a dose subtherapeutic for one patient may be toxic for another. Its inclusion, therefore, in over-the-counter (OTC) medicines has been questioned. Franolyn Expect (theophylline 120 mg, guaiphenesin 50 mg, and ephedrine 9.5 mg in each 10 mL adult dose), an OTC product marketed for relief of chesty coughs, was investigated. Twenty-nine healthy adult volunteers (six smokers) participated in a study to determine the range of serum concentrations of theophylline in subjects taking the manufacturer's recommended dosage. Peak serum concentrations of theophylline occurred at a mean time of 1.4 ± 0.7 (SEM) hours after dose administration. There was wide variability in the maximum serum concentration (range 2.6 to 11.1 mg/L) with means of 6.8 mg/L in nonsmokers and 5.1 mg/L in smokers. Predose mean serum concentrations were 4.5 mg/L and 1.9 mg/L for nonsmokers and smokers, respectively. Nausea, a common complaint, was greater than expected; one patient reported insomnia. It was concluded that theophylline in recommended doses will not produce serious adverse reactions, even in slow metabolizers.

86–0059. Trell, L.; Korsgaard, R.; Janzon, L., et al. **Relation Between Aryl Hydrocarbon Hydroxylase Inducibility, Serum Gamma-Glutamyltransferase and Serum Cholesterol in Middle-Aged Smokers and Non-Smokers.** *Anticancer Research* 5(2):157-159, March-April 1985.

Results indicate that tobacco smoke and alcohol do not appear to exert their carcinogenic effects either by way of or parallel with low serum cholesterol. Aryl hydrocarbon hydroxylase (AHH) inducibility, carbon monoxide (CO) in expired air, serum gammaglutamyltransferase (GGT), and total serum cholesterol levels were compared in equal-sized, age-matched samples of healthy middle-aged males. The men (smokers and nonsmokers), born in 1921, 1934 to 1936, and 1946, participated in the ongoing preventive medical population program in Malmo, Sweden. No consistent differences in CO, GGT, or total serum cholesterol levels were detected between smokers and nonsmokers or between subjects with different levels of AHH inducibility. Furthermore, no significant differences in mean values of AHH inducibility were observed between smokers and nonsmokers. Smoking and alcohol may exert their effects by other mechanisms than enzyme (AHH) induction per se; however, a high level of AHH inducibility seems to be of importance in many smoking-dependent cancers. Results do not contradict the carcinogenic influences of smoking or alcohol nor the role of the intracellular mixed-function oxygenase enzyme system, but speak against the hypothesis that they are interrelated with low plasma cholesterol.

86–0060. Watanabe, T.; Fujita, H.; Koizumi, A., et al. **Baseline Level of Blood Lead Concentration Among Japanese Farmers.** *Archives of Environmental Health* 40(3):170-176, May-June 1985.

See also **86–0208, 86–0218**

Analysis of blood samples from farmers in various parts of Japan showed that lead (Pb) concentrations varied with smoking habits, alcohol consumption, age, sex, and geographic region. Blood Pb concentrations were determined for more than 2,500 samples (more than 2,000 taken during winter and approximately 500 taken during summer) to establish reliable baselines levels. After eliminating the effects of smoking, aging, and alcohol consumption, blood Pb levels distributed log-normally with a geometric mean of 48.6 μg/L (±1.51) for males and 32.1 μg/L (±1.50) for females, among the lowest in the industrialized countries of the world. The sex difference was significant ($p<0.01$), but the difference in Pb between winter and summer was essentially insignificant. Mean Pb levels in male nondrinkers were 37.9 μg/L in nonsmokers, 36.4 μg/L in smokers of 1 to 10 cigarettes/day, and 50.3 μg/L in smokers of 11 to 20 cigarettes/day. Pb levels in smokers of 20 cigarettes/day plateaued, and were 44.9 μg/L in smokers of >20 cigarettes/day. Pb levels rose with increases in alcohol consumption, which had an additive effect with smoking on Pb blood levels. Although some increase in Pb blood levels was observed in women, the effects of tobacco and alcohol use were less clear, probably because only 3 percent were smokers and only 4 percent consumed alcohol. (Auth. Abs. Mod.)

86–0061. Yoda, B.; Goto, Y.; Sato, K., et al. **Ultra-Weak Chemiluminescence of Smokers' Blood.** *Archives of Environmental Health* 40(3):148-150, May-June 1985.

Plasma samples from smokers showed significantly ($p<0.001$) higher levels of chemiluminescence than those from nonsmokers. An extremely sensitive single photon counter was developed to quantify very weak, spontaneous light emission from human blood samples. Most of the luminescence came from the plasma. Subsequently, ultra-weak chemiluminescence was measured in plasma samples from 56 healthy males (27 smokers, 10 ex-smokers, and 19 never smokers). Plasma samples from current smokers showed twice as much chemiluminescence as samples from nonsmokers. No differences were observed between ex-smokers and never smokers. In one smoker who quit, plasma chemiluminescence dropped to levels similar to those of nonsmokers within 12 hours, indicating that the effects of smoking are short term.

MORTALITY AND MORBIDITY

86–0062. Bonassi, S.; Ceppi, M.; Puntoni, R., et al. **Mortality Studies of Dockyard Workers (Longshoremen) in Italy.** *American Journal of Industrial Medicine* 7(3):219-227, 1985.

Although an excess of lung, laryngeal, and intestinal cancer was found among Italian dockyard workers, the role of smoking is unclear. Data was collected in a mortality study conducted in five Italian harbors (Savona, Marina di Carrara, Livorno, Civitavecchia, and Ravenna). The cohort included active and retired workers (longshoremen) who had been employed between 1960 and 1981. Causes of death were ascertained from death certificates; expected numbers of deaths were generated from age, sex, calendar year, and cause-specific national mortality rates. There was a higher proportion of smokers among dockyard workers (80.9 percent) than among civil servants (75.3 percent), but such a difference seems unlikely to explain the excess of lung cancer found. In Marina di Carrara, Livorno, and Ravenna, no significant excess of cancer was observed, probably as a consequence of the population's young age; in Civitavecchia and Savona, an excess of lung and intestinal cancers was reported. Among workers aged 50 and over, the proportion of nonsmokers was similar for dockworkers (14 percent) and civil servants (15 percent). The low overall mortality of dockyard workers is in agreement with procedures of health selection typical of physically demanding jobs. (Auth. Abs. Mod.)

86–0063. Cooper, R. **Smoking and Health in the Soviet Union and Eastern Europe.** *New York State Journal of Medicine* 85(7):413-415, July 1985.

Cigarette consumption and related disease trends in the East bloc countries are presented from the focal point of similarity to the situation in the United States. Comprehensive mortality data from the USSR have not been available since the mid-1970s, and cause-specific data from Eastern Europe are often difficult to interpret. In the United States, which produces twice as many cigarettes as the USSR, per capita consumption is 4,000/year compared with 2,000/year in the USSR. Coronary heart disease (CHD) and lung cancer mortality data in Soviet cities and Slavic regions are remarkably similar. Death rates from CHD in the USSR rose to 40 percent among middle-aged men and women between 1960 and 1970, while lung cancer increased primarily among men. There has been a gradual and steady increase in per capita cigarette use (69 percent higher in 1980 than in 1962). The proportion of men who smoke ranges from 44 to 69 percent. Among men and women between 20 and 29 years of age, 60 percent and 17 percent, respectively, are smokers. Average daily cigarette consumption is 18.1 for men and 14.7 for women. In Poland, smoking rates are even higher: adult average consumption was 2,633 cigarettes/year in 1980. Percentages of smokers in relation to education in other bloc countries (Czechoslovakia, East Germany, Hungary, and Bulgaria) are also tabulated.

86–0064. Cooper, R.; Simmons, B.E. **Cigarette Smoking and Ill Health Among Black Americans.** *New York State Journal of Medicine* 85(7):344-349, July 1985.

Coronary heart disease (CHD) is the most common cause of death among black Americans, accounting for 20 percent of all mortality. Risk of CHD is increased by the high prevalence of smoking; 45 percent of black men and 30 percent of black women smoke. Widespread smoking has also accelerated development of atherosclerosis. The increase in lung cancer among men since 1950 has been three times greater for blacks than for whites; age-adjusted rates for men are now almost 40 percent higher among blacks, and are still rising. Although the health consequences of smoking extend beyond CHD and lung cancer, these disease categories subsume the majority of cigarette-related deaths and demonstrate epidemiologic patterns. Currently, cigarette smoking displays a sharp class gradient, being concentrated among the working class and the poor of both races. There is no likelihood of effective cures for smoking-related diseases. Prevention lies in greater awareness of the ill effects of smoking and of the pernicious and pervasive influence of the tobacco companies. Increased antismoking efforts, particularly by the medical community, can change smoking habits of patients. Approximately 25 percent of patients will stop permanently at the urging of a physician, making this approach perhaps the single most potent means of influencing individual behavior.

86–0065. Copeland, A.R. **Accidental Fire Deaths. The 5-Year Metropolitan Dade County Experience From 1979 Until 1983.** *Zeitschrift fur Rechtsmedizin* 94(1):71-79, 1985.

Analysis of 108 accidental fire deaths that occurred in Dade County (including Miami), Florida, between 1979 and 1983 showed that cigarettes are a major contributor to fire-related mortality. Of the more than 79 percent of deaths that occurred in residences, 20.4 percent were related to cigarettes or cigarette lighters and 8.3 percent were due to playing with matches or lighters. The second most common cause was electric shorts (18.5 percent). The remainder resulted from factors such as airplane crashes, flaming foods, and candles, with 21.1 percent listed as unknown. About 14 percent of victims were less than 5 years old, 20.4 percent were over age 70, and the remainder were evenly distributed by age. A predominance of white males was noted. A review of cases where blood analysis was done showed that half the victims had a blood alcohol content of 0.1 percent or higher, and in 9.3 percent of those tested, other drugs were detected. About 30 percent had carboxyhemoglobin levels of 40 percent or higher.

86–0066. Dobson, A.J.; Gibberd, R.W.; Leeder, S.R., et al. **Occupational Differences in Ischemic Heart Disease Mortality and Risk Factors in Australia.** *American Journal of Epidemiology* 122(2):283-290, August 1985.

Reduction in cigarette smoking, blood pressure, triglycerides, and body mass and increase in exercise among higher status occupation groups, according to an Australian survey, suggest a pattern of coronary prevention behavior that may be responsible for the decline in ischemic heart disease. Mortality rates dropped 25 percent from 1969 to 1978, with professional workers experiencing greatest decline. Those in lower socioeconomic groups had higher mortality rates and experienced smaller declines. Occupational differences in ischemic heart disease mortality were compared with risk factors measured in a National Heart Foundation survey on a random sample of people (aged 25 to 64 years) residing in Brisbane, Sydney, Melbourne, Hobart, Adelaide, and Perth. The professional group (10 percent of the population in 1976) had a relatively low death rate and a decline of 36 percent; the clerical/sales group (12 percent) had a slightly higher death rate but a similar decline; the trades/labor group (35 percent) experienced a 25 percent decline; and the service group (13 percent) had the highest mortality rates. The administrative group (9 percent) had the smallest decline (10 percent); the farming group (7 percent) had low mortality rates and a relatively small decline; and others (14 percent), including the unemployed, had initially low mortality rates that increased over the period measured. (Auth. Abs. Mod.)

86–0067. Fielding, J.E. Smoking: **Health Effects and Control. (First of Two Parts).** *New England Journal of Medicine* 313(8):491-498, August 22, 1985.

Smoking accounts for an estimated 170,000 coronary heart disease deaths, 125,000 cancer deaths, and 62,000 obstructive lung disease deaths each year in the United States. This review covers the role of tobacco in cerebrovascular, peripheral arterial occlusive, and coronary heart diseases and the relationship of smoking to cancers of the lung, larynx, oral cavity, esophagus, bladder, pancreas, and other tumors. The association of smoking with chronic obstructive lung disease, peptic ulcer, nonmalignant diseases of the mouth, and body weight are also reported. Health issues of passive smoking are explored, including risks of lung cancer, risks to children, effects in healthy adults, and the in utero effects of maternal smoking. The economic costs of smoking to society and to nonsmokers are outlined, and current trends in cigarette use among both adults and teenagers are summarized.

86–0068. Leigh, J.P. **An Empirical Analysis of Self-Reported, Work-Limiting Disability.** *Medical Care* 23(4):310-319, April 1985.

Longitudinal analysis showed that daily cigarette consumption was strongly and positively associated with the probability of becoming disabled. Data from the Michigan Panel Study of Income Dynamics involving the heads of 5,000 randomly selected families were used to study correlates of the incidence of self-reported disability. Because the data base used followed individuals for a number of years, simultaneity bias was avoided. Among the many regressors considered, holding a hazardous job, being recently divorced or widowed, smoking cigarettes, experiencing unemployment, and frequently working overtime were positively associated with becoming disabled, while education and risk preference were negatively associated. Moreover, the findings suggest that some of the reasons for the strong association between health and schooling in prior studies include the association between schooling, fewer cigarettes smoked, greater access to a safe job, smaller chance of unemployment, and a strong dislike of risk. (Auth. Abs. Mod.)

86–0069. Pearce, N.E.; Davis, P.B.; Smith, A.H., et al. **Social Class, Ethnic Group, and Male Mortality in New Zealand, 1974-8.** *Journal of Epidemiology and Community Health* 39(1):9-14, March 1985.

Data on social class mortality differences in New Zealand males aged 15 to 64 years for 1974 to 1978 revealed that smoking patterns accounted for much of the increased risk for classes III and IV, but did not appear to explain high mortality rates in class V. Mortality gradient was similar to that previously found in England and Wales, but the New Zealand pattern was nonlinear, with particularly high mortality in class V. Patterns for major disease groupings also paralleled those previously found in England and Wales, with coronary heart disease and neoplasms displaying weaker gradients than accidents, respiratory diseases, digestive diseases, and infectious diseases. Maori and non-Maori males had comparable social class mortality gradients, but Maori mortality rates were approximately 50 percent higher than non-Maori rates in each class. (Auth. Abs. Mod.)

86–0070. Walrath, J.; Rogot, E.; Murray, J., et al. **Mortality Patterns Among U.S. Veterans by Occupation and Smoking Status.** U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, NIH Publication No. 85-2756, February 1985, 321 pp.

Mortality patterns related to smoking habits and occupation were analyzed in 293,958 white men, aged 31 to 84, who held active U.S. Government life insurance policies in January 1954. Mortality from selected causes among individuals employed in specific occupations was compared with mortality in the entire cohort to identify occupational patterns that deserve further evaluation. Data on self-reported smoking habits from questionnaires administered in 1954 and 1957 were used to compare mortality patterns in various occupations among ever smokers and never smokers. For many occupations, the number of never smokers was too small to provide stable estimates. In general, however, the crude and smoking-adjusted standardized mortality ratios (SMRs) are similar, and only crude SMRs are given in the tabular data that include SMRs for 160 occupational categories for 16 cancer sites, 8 cardiovascular diseases, 4 non-neoplastic respiratory diseases, 4 digestive diseases, and 3 other causes of death. Tabular data are also provided according to cause of death. (Auth. Abs. Mod.)

86–0071. Walrath, J.; Rogot, E.; Murray, J., et al. **Mortality Patterns Among U.S. Veterans by Industry and Smoking Status.** U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, NIH Publication No. 85-2747, February 1985, 286 pp.

Industrial mortality patterns were analyzed with respect to smoking habits among 293,958 white U.S. veterans, aged 31 to 84, who held active U.S. Government life insurance policies in January 1954. Mortality from selected causes among individuals employed in specific industries was compared with mortality experienced by the entire cohort to identify industry patterns that deserve further evaluation. Data on self-reported smoking habits from questionnaires administered in 1954 and 1957 are used to compare mortality patterns in various industries among ever smokers and never smokers. For many industries, the number of never smokers was too small to provide stable estimates. In general, however, the crude and smoking-adjusted standardized mortality ratios (SMRs) are similar, and only crude SMRs are given in tabular data that include SMRs from 145 industry categories for 16 cancer sites, 8 cardiovascular diseases, 4 non-neoplastic respiratory diseases, 4 digestive disorders, and 3 other causes of death. Mortality data are also provided according to cause of death. (Auth. Abs. Mod.)

86–0072. Winklestein, W., Jr. **Some Ecological Studies of Lung Cancer and Ischaemic Heart Disease Mortality in the United States.** *International Journal of Epidemiology* 14(1):39-47, March 1985.

National and statewide statistical data on smokers and on prevalence of high serum cholesterol and elevated blood pressure are used to show correlations with lung cancer and ischemic heart disease (IHD) mortality. The data provide conclusive evidence that lung cancer mortality among young American men is declining as a result of the decreased prevalence of smoking and reduction in the average tar content of American cigarettes. The decline will be extended to older age groups if successive cohorts continue the downward trend in smoking. In addition, there is reason to believe that the same trend can be realized among women if the downward trend in smoking prevalence can be extended to them. Data from 25 states also show a consistent association between prevalence of cigarette smoking and IHD mortality and, in spite of a substantial decline in IHD mortality that occurred around 1970, IHD remains the most important cause of death in the United States, accounting for close to 40 percent of all mortality. It is concluded that about 50 percent of the decline in IHD mortality can be explained by changes in prevalence of high serum cholesterol, elevated blood pressure, and cigarette smoking. Although exposure to the environmental effects of general air pollution, toxic chemical waste dumps, low-level ionizing radiation, and food additives should not be overlooked, their influence is relatively unimportant in cancer and heart disease mortality.

NEOPLASTIC DISEASES

86–0073. Bako, G.; Ferenczi, L.; Hanson, J., et al. **Factors Influencing the Survival of Patients With Cancer of the Stomach.** *Clinical and Investigative Medicine* 8(1):22-28, 1985.

Increased age and British ethnicity (among males) were associated with poor survival prospects among stomach cancer patients in a Canadian study evaluating prognostic indicators for survival. Smoking appeared to be among the least useful indicators in patients of both sexes who had a median survival of 15 months. Survival of 332 males and 135 females at the Cross Cancer Institute (Edmonton, Alberta) from 1969 through 1973, was followed for 8 years with rates calculated using the Kaplan-Meier method. Survival rates were similar to those reported for other countries. Search for factors influencing survival is important because stomach cancer in Alberta is one of the 10 most common cancers. A large number of environmental and lifestyle factors and clinical factors relating to stage of disease and treatment were examined using Cox's proportional hazard model. Surgical treatment and presence of metastases were important determinants of survival for both sexes. Relative hazards of dying for various combinations of factors are presented. (Auth. Abs. Mod.)

86–0074. Bierman, H.R. **Multiple Primary Neoplasms and Tumor Diathesis.** *Mount Sinai Journal of Medicine* 52(6):435-442, June 1985.

Human studies identifying a population with the high probability of developing cancer could lead to effective prevention and elimination of cancer. However, conclusive statistical data on prevention are highly inferential, e.g., 90 percent of lung cancers are associated with smoking. Physicians imply that avoiding tobacco will prevent cancer of the lung. Yet at least 10 percent of patients with primary lung cancer have never used tobacco and most persons who use tobacco do not develop lung cancer. Cancer patients are susceptibile to malignant disease, and many of them will develop multiple primary neoplasms (MPN). MPN patients exhibit tumor diathesis synchronously/simultaneously (or within 1 year of each other) on average of 3.3 percent (1 to 5.1 percent). Remaining patients (95 percent) either fail to develop another detectable neoplasm or subsequently develop neoplasms nonsynchronously (or at intervals greater than 1 year). Time intervals range from 2 to 21 years between primary neoplasms. Nonsynchronous neoplasms average 23 percent (15 to 35 percent) depending on type and site of origin. Nonsynchronous MPN occur at least 10 times more frequently than synchronous neoplasms. Nonsynchronous dominance of persons with a tumor diathesis may be the result of numerous factors. Chemical and biologic agents to be considered for protection and prevention in people with tumor diathesis are presented.

86–0075. Blum, A.; Evans, P. **Japan: Land of the Rise in Lung Cancer. U.S. Government Aids Cigarette Sales.** *New York State Journal of Medicine* 85(7):425-427, July 1985.

Japan's 11-billion dollar cigarette market is twice the size of the country's famed telecommunications market. Although lung cancer is the fastest growing cause of death, the government has shown little interest in resolving problems associated with smoking. Seventy percent of Japanese men (more than double the percentage for American men) admit to being regular cigarette smokers. Manufacturers that direct cigarette advertisements toward adolescents and young adult women include foreign cigarette companies (Philip Morris, R.J. Reynolds, Brown and Williamson Tobacco) who have increased their advertising in recent years, often employing American movie stars to glamorize smoking. Additional support from the Reagan administration, pressing the Japanese government to permit increased imports of tobacco, is considered by antismoking groups to be hypocritical, particularly because the product being exported is labeled dangerous within the United States. Efforts to assert rights of nonsmokers, begun in 1978, are rapidly growing into a national movement to ban smoking in public places. Japan Action for Nonsmokers' Rights (JANR), backed by public complaints, is lobbying for nonsmoking areas on public transportation, in hospital waiting rooms, and in the workplace. JANR is credited with calling attention to targeting of adolescents and women by Japanese cigarette advertisers, and to advertising claims that are fraudulent and possibly even criminal.

86–0076. Bulletin of the World Health Organization. **Control of Oral Cancer in Developing Countries. A WHO Meeting.** *Bulletin of the World Health Organization* 62(6):817-830, 1984.

The association between tobacco use (especially tobacco chewing) and oral cancer incidence in developing countries is reviewed and the epidemiology, etiology, pathology and natural history, primary prevention, early detection, diagnosis, and treatment of oral cancer is discussed. Priorities for oral cancer control and recommendations for future research are included. Oral cancer is one of the 10 most common cancers in the world. It is the most common cancer in Bangladesh, India, Pakistan, and Sri Lanka, accounting for about one third of all cancers. The prospects of survival are poor for the more than 100,000 new cases that occur every year in south and southeast Asia. However, oral cancer is preventable, which underscores its importance as a public health priority. Tobacco use, the most common cause of oral cancer, is well known and can be eliminated. For oral cancer cases that do occur, early detection and treatment can result in long-term survival. With firm commitment, correct priorities, and concerted efforts by governments and individuals, strategies can be designed and programs can be implemented for disease prevention. The economic saving in health care costs justifies such actions; prevention of suffering and death of oral cancer victims makes them mandatory. (Auth. Abs. Mod.)

86–0077. Esteve, J.; Tuyns, A.J.; Raymond, L., et al. **Tobacco and the Risk of Cancer. Importance of Kinds of Tobacco.** In: O'Neill, I.K.; Von Borstel, R.C.; Miller, C.T. (Editors). *N-Nitroso Compounds: Occurrence, Biological Effects and Relevance to Human Cancer.* IARC Scientific Publication No. 57, Geneva, IARC, 1984, pp. 867-876.

Evidence indicates that air-cured tobacco and flue-cured tobacco do not differ significantly in carcinogenicity. To determine whether leaf curing methods influence tobacco carcinogenicity, interviews were conducted with 1,529 lung cancer patients and 2,899 matched controls (France), 163 laryngeal cancer patients and 1,498 controls (Spain and France), 701 esophageal cancer cases and 922 controls (France), and 502 bladder cancer patients and 596 matched controls (Italy). Data on brand of cigarettes and cigar and pipe tobacco used showed that bright and black tobaccos were equally correlated with lung cancer. Although a large variation in the lung/laryngeal cancer mortality rate ratio was observed, the data pointed to alcohol consumption patterns as the factor responsible. Compared with smokers of black tobacco, bright tobacco-only users apparently have a lower risk of bladder cancer, but only among those consuming >10 cigarettes/day. Data also suggest that bright tobacco users are at lower risk of esophageal cancer, although the small number of users made evaluations uncertain.

86–0078. Harada, T.; Kitazawa, T.; Maita, K., et al. **Effects of Vitamin C on Tumor Induction by Diethylnitrosamine in the Respiratory Tract of Hamsters Exposed to Cigarette Smoke.** *Cancer Letters* 25(2):163-169, March 1985.

Vitamin C may inhibit tumor induction by diethylnitrosamine (DEN) and exposure to cigarette smoke in the nasal cavity, but appears to accelerate development of laryngeal and tracheal tumors. A large dietary supplement of vitamin C (1 percent) was given to smoke-exposed male Syrian hamsters, which also received 12 weekly subcutaneous injections of (DEN), to determine if high doses of vitamin C could prevent DEN-induced respiratory tumors. Treatment with DEN induced various types of tumors in the respiratory tract; exposure to cigarette smoke caused tumors in the nasal cavity, larynx, and trachea. Compared with smoke-exposed hamsters treated with DEN, vitamin C-supplemented hamsters had lower incidence of nasal cavity tumors and earlier appearance of tracheal tumors. Laryngeal tumors also tended to develop earlier in vitamin C-supplemented hamsters. (Auth. Abs. Mod.)

86–0079. Heppleston, A.G. **Silica, Pneumoconiosis, and Carcinoma of the Lung.** *American Journal of Industrial Medicine* 7(4):285-294, 1985.

Reexamination of research data on workers exposed to silica and other dusts suggest that smoking may be a more important risk factor than silica for lung cancer. Arguments are made to exonerate silicon dioxide from allegations that silica exposure entails a consequential risk of lung cancer. If allowances are made for substances inhaled concomitantly with exposure to silica and for personal pollution by cigarette smoking, evidence is weighted against the carcinogenic role for uncombined silicon dioxide. Morbidity and mortality experience divorced from or incompletely related to data on environmental exposure fails to clarify the current argument on carcinogenicity of inhaled silica. It is suggested that human evidence provides the ultimate basis for assessing such risks, and numerous studies on effects of inhaling dusts rich or poor in silica on prevalence of pulmonary carcinoma have been performed on subjects from major mining areas of the world. Pneumoconiosis from compact mineral particles does not appear to determine onset of lung cancer; cellular behavior suggests different responses to compact and fibrous particles acting alone. In occupational situations where an increased risk of lung cancer occurs or is suspected, cigarette smoking has to be assessed, since where a risk appears to exist with respect to a silica hazard, smoking is likely to be a major contributor. (Auth. Abs. Mod.)

86–0080. Hill, G.B. **Cancer in Canada: An Epidemiological Perspective.** *Canadian Family Physician* 31:1219-1228, June 1985.

Among males in Canada, cancer associated with tobacco and alcohol use is highest in Quebec and Ontario, moderately high in British Columbia, and lowest in the Atlantic and Prairie regions. Cancer associated with tobacco and occupational exposure to dust and chemicals is highest in Ontario and British Columbia, moderately high in Quebec, and lowest in the Atlantic and Prairie regions. Generally, incidence of cancer in Canada has risen steadily over the past 20 years, with a percentage increase of 1.3/year in males and 0.5/year in females. In 1980, incidence was 333/100,000 in males and 259/100,000 in females. Over age 45, incidence of lung and laryngeal cancers increased in both sexes, as did cancer of the prostate in males. Incidence of melanoma and other skin cancers is increasing in both sexes. Although cervical cancer among women aged 35 and over declined during the 1970 to 1980 decade, incidence among younger women increased. Epidemiological trends over time and regional differences in incidence are generally in keeping with what is known (and what is not known) about the etiology of cancer.

86–0081. Kantor, A.F.; Hartge, P.; Hoover, R.N., et al. **Familial and Environmental Interactions in Bladder Cancer Risk.** *International Journal of Cancer* 35(6): 703-706, June 1985.

Risk of bladder cancer among persons with a family history of urinary tract neoplasms is increased 45 percent and further enhanced by heavy cigarette smoking and possibly environmental factors. History of urinary tract cancer in first degree relatives of 2,982 bladder cancer patients was obtained and compared with 5,782 controls in 10 geographic areas of the United States to assess the role of environmental risk factors. A family history of urinary tract cancer significantly elevated risk of bladder cancer (relative risk (RR) = 1.45), with higher risks observed among patients under age 45. Risks of bladder cancer associated with positive family history were generally higher among people with suspected environmental exposures, particularly heavy smoking (RR = 10.7 among those who smoked three or more packs of cigarettes/day). It is suggested that further studies of bladder cancer incorporate biochemical and genetic probes to assess mechanisms of familial susceptibility and interactions with environmental factors. (Auth. Abs. Mod.)

86–0082. Kantor, A.F.; Hartge, P.; Hoover, R.N., et al. **Tuberculosis Chemotherapy and Risk of Bladder Cancer.** *International Journal of Epidemiology* 14(1):182-184, March 1985.

Risk of bladder cancer associated with tuberculosis chemotherapy was not consistently elevated by cigarette smoking in a study of 2,982 bladder cancer patients and 5,782 population controls from 10 geographical areas of the United States. Excess risk was also not associated with medications used for tuberculosis treatment or prophylaxis (relative risk (RR) = 0.95). Findings agree with other epidemiological studies that have not confirmed earlier reports linking isoniazid exposure with risk of bladder cancer. (Auth. Abs. Mod.)

86–0083. Kennedy, A.R. **Relevance of Tumor Promotion to Carcinogenesis in Human Populations.** *Carcinogenesis* 8:431-435, 1985.

Recent research into tumor-promoting agents suggests that cell proliferation is absolutely essential for occurrence of malignant transformation. Studies of uranium mining populations have indicated that cigarette smoke acts as a promoter for lung carcinogenesis. Promoting agents have the ability to produce more tumors and to reduce the latent period for tumor development, compared with the expectation following exposure to the carcinogenic agent alone. Cigarette-smoking white miners had a higher incidence of lung cancer, and tumors appeared earlier in time compared with nonsmoking uranium miners. The dose—response curve for lung cancer incidence vs. radiation dose for smoking white miners is clearly linear; presence of a promoting agent in radiation carcinogenesis often results in a linear curve, in both in vivo and in vitro experimental studies. Hormones influence carcinogenesis in laboratory animals; estrogen, particularly, increases the incidence of cancer. Many of the effects of tumor-promoting agents on cultured cells are similar to hormonal actions. Like the reversible actions of tumor-promoting agents in vivo and in vitro, many tumors in animals, such as mouse mammary tumors, are under hormonal controls in that removal of a necessary hormone can cause tumor regression. Such a reversible effect is what would be expected of a promoting agent operating in human carcinogenesis.

86–0084. Kestner, J.F., Jr. **Cigarette Smoking and Lung Cancer: A Modern Tragedy.** *Delaware Medical Journal* 57(7):443-445, July 1985.

Numerous studies have confirmed the relationship between smoking and lung cancer originally suggested in the 1930s. It is estimated that 144,000 new lung cancer cases and 125,600 lung cancer deaths will occur in the United States in 1985. Lung cancer has been the leading cause of cancer mortality in men since the mid-1950s, and is expected to become the leading cause of cancer mortality in women during the 1980s. Approximately 85 percent of lung tumors are caused by smoking and are thus preventable. Overall, smokers are 10 times more likely to develop a respiratory tract neoplasm than nonsmokers. The risk is even higher in heavy smokers. However, the risk decreases following cessation of smoking; lung cancer mortality in ex-smokers is inversely related to the number of years since quitting. Premalignant changes have also been observed in smokers, strengthening the association between cigarette use and lung cancer and providing a potential means of early detection.

86–0085. Lesko, S.M.; Rosenberg, L.; Kaufman, D.W., et al. **Cigarette Smoking and the Risk of Endometrial Cancer.** *New England Journal of Medicine* 313(10):593-596, September 5, 1985.

In a hospital-based case—control study of 510 women with endometrial cancer (cases) and 727 women with other cancers (controls), it was found that women who smoke heavily may have a lower risk of endometrial cancer than nonsmokers. The rate-ratio estimate (relative risk) for current smokers compared with women who had never smoked was 0.7 (95 percent confidence interval, 0.5 to 1.0). For former smokers the estimate was 0.9 (0.6 to 1.2). For women currently smoking ≥ 25 cigarettes/day, the rate-ratio estimate was 0.5 (0.3 to 0.8), an effect that appeared to be confined to postmenopausal women, among whom the estimate was 0.5 (0.2 to 0.9). Among premenopausal women the estimate was 0.9 (0.4 to 2.2), but the difference between the two estimates could have been due to chance. The present findings do not have direct public health importance since cigarettes, overall, have serious deleterious effects. However if the results are confirmed, elucidation of the underlying mechanisms whereby smoking reduces the risk would be of interest and might be useful in the development of strategies for preventing endometrial cancer. (Auth. Abs. Mod.)

86–0086. Miller, A.B.; Choi, B.C.K.; Howe, G.R., et al. **Epidemiological Assessment of Risk to Humans From Exposure to Nitrosamines.** In: O'Neill, J.K.; Von Borstel, R.C.; Miller, C.T., et al. (Editors). *N-Nitroso Compounds: Occurrence, Biological Effects and Relevance to Human Cancer.* IARC Scientific Publication No. 57, Geneva, IARC, 1984, pp. 929-936.

Various approaches are described for assessing indirect human exposure to N-nitrosamines using standard epidemiological methods. Also, a method for more direct estimation of an index of exposure based on the known kinetics of N-nitrosamine formation was derived and applied in a case—control study of cerebral tumors (200 cases and a corresponding number of matched hospital controls). The method utilized data on N-nitrosodimethylamine (NDMA) content of foods. NDMA is regarded as a representative N-nitrosamine in relation to such data. Exogenous nitrate, nitrite, and NDMA levels are estimated on the basis of questionnaire information relating to consumption of selected food items, cigarettes, and alcoholic beverages. Endogenous nitrate formation is assumed to be negligible, nitrite is assumed to derive from 5 percent of ingested nitrate, and endogenous NDMA formation is assumed to be proportional to the amine concentration and the square of the nitrite concentration. Results suggest increased risk owing to exogenous, but not total, N-nitrosamine exposure.

86–0087. Mossman, B.T.; Cameron, G.S., Yotti, L.P. **Cocarcinogenic and Tumor Promoting Properties of Asbestos and Other Minerals in Tracheobronchial Epithelium.** *Carcinogenesis* 8:217-238, 1985.

Data on interactions between asbestos and chemical carcinogens in cigarette smoke at the cellular level are summarized. Epidemiologic and experimental studies document a synergistic effect of asbestos and smoking in induction of bronchogenic carcinoma. The increased risk in nonsmoking asbestos workers is approximately fourfold compared with nonsmokers in the general population; however, individuals who smoke and are occupationally exposed to asbestos have an eighty- to ninety-fold increased risk. Asbestos fibers and other particulates appear to act as condensation nuclei for polycyclic aromatic hydrocarbons (PAH) in the occupational setting or environment, facilitating transfer of the chemical carcinogens into target cells (i.e., those destined to develop into tumor cells). As a result, adduct formation of PAH to DNA is encouraged, an event linked intrinsically to initiation of transformation. Alternatively, asbestos appears to enhance and modulate further development of initiated cells to neoplastic cells by a process resembling tumor promotion in mouse skin. Results suggest that asbestos is a weak carcinogen, but an important promoter of carcinogenesis in the respiratory tract. Studies show striking effects of asbestos fibers on cell proliferation and differentiation, although these responses appear to occur also after exposure of tracheobronchial cells to nonasbestos fibers including fiberglass.

86–0088. Park, N.-H.; Herbosa, E.G.; Niukian, K., et al. **Combined Effect of Herpes Simplex Virus and Tobacco on the Histopathologic Changes in Lips of Mice.** *Oral Surgery* 59(2):154-158, February 1985.

The effect of herpes simplex virus (HSV-1) inoculation and tobacco application (snuff water extract or tobacco tar condensate) on histopathologic changes of mouse labial mucosa was studied. Two month's exposure to tobacco or HSV-1 inoculation alone did not induce dysplasia in epithelium of labial mucosa. However, HSV-1 inoculation combined with snuff water extract or tobacco tar condensate produced epithelial dysplasia and other histomorphologic changes (i.e., hyperkeratosis, increased granular cell layer thickness, acanthosis, and increased inflammatory cell infiltration), indicating possible synergism in the development of precancerous oral lesions and oral cancer. (Auth. Abs. Mod.)

86–0089. Pharmaceutical Journal. **Warning on "Tobacco Teabags."** *Pharmaceutical Journal* 234(6331):678, June 1985.

Snuff-dipping, a practice of sucking tobacco contained in a small sachet, increases the likelihood of oral cancer. The British Department of Health has alerted physicians that use of "tobacco teabags," according to its committee on carcinogenicity, significantly increases the risk of developing mouth cancer, which can result in disfigurement or death. U.S. Tobacco International, makers of Skoal Bandits, the brand of tobacco sachets most widely sold in the United Kingdom, has agreed with the government not to direct marketing at nonsmokers or people under 18 years of age. Some smokers, it is suggested, may be tempted to try snuff-dipping either in an attempt to give up cigarettes or as an alternative. The Health Department has cautioned that although the habit is less dangerous than cigarette smoking, it cannot be considered safe.

86–0090. Preston-Martin, S.; Henderson, B.E. ***N*-Nitroso Compounds and Human Intracranial Tumours.** In: O'Neill, J.K.; Von Borstel, R.C.; Miller, C.T., et al. (Editors). *N-Nitroso Compounds: Occurrence, Biological Effects and Relevance to Human Cancer.* IARC Scientific Publication No. 57, Geneva, IARC, 1984, pp. 887-894.

Cigarette smoke is a source of N-nitroso compounds that are implicated in the etiology of nervous system neoplasms. Information concerning exposure to N-nitroso compounds was obtained from three case—control studies of intracranial tumor patients in Los Angeles County, California. The most striking results were obtained in 209 matched pairs of young patients. Increased risk was associated with maternal contact with substances containing N-nitrosamines during pregnancy, including sidestream cigarette smoke (odds ratio (OR) 1.5, $p=0.03$), burning incense (OR 3.3, $p<0.01$), facial makeup (OR 1.6, $p=0.02$), use of diuretics (OR 2.0, $p=0.03$) and antihistamines (OR 3.4, $p<0.01$), and with the level of maternal consumption of cured meat ($p<0.01$). Although maternal smoking was not related to incidence of tumors in offspring (OR 1.1, $p=0.42$), living with a smoker (usually the child's father) was, indicating that paternal exposures are important. The N-nitrosamines in cigarette smoke may act through the father rather than the mother to produce the carcinogenic effects observed.

86–0091. Seidenfeld, J.J. **Screening for Bronchogenic Carcinoma.** *Annals of Internal Medicine* 102(6):851-852, June 1985.

A multicenter collaborative screening study for lung cancer in 30,000 men over age 45 who smoked one or more packs of cigarettes/day found that early detection led to a high rate of resectability in patients with bronchogenic cancer. However, overall prevalence of this disease was low, despite selection of a high-risk population. Chest roentgenography appeared to be the most sensitive method for detecting bronchogenic cancer, and sputum cytology the most effective means of detecting early squamous cell carcinoma, but screening was not considered to be of sufficient clinical value to justify the examination. It is suggested that if screening is planned, it should be within the context of a general health care evaluation. Screening is thus not recommended unless subsequent incidence studies show clear usefulness. In the meantime, care for the smoker over 45 years of age should be individualized with recommendations that patients at risk stop smoking.

86–0092. Shamsuddin, A.K.M.; Sinopoli, N.T.; Hemminki, K., et al. **Detection of Benzo(*a*)pyrene: DNA Adducts in Human White Blood Cells.** *Cancer Research* 45(1):66-68, January 1985.

Metabolic activation of benzo(*a*)pyrene (BaP) to its ultimate carcinogenic form, 7β,8α-diol-9α,10α-BaP epoxide (BPDE), and the binding of BPDE to DNA are important steps in BaP carcinogenicity in experimental animals. Since certain occupational groups are exposed to high concentrations of BaP, enzyme-linked immunosorbent assay and ultrasensitive enzymatic radioimmunoassay were used to measure BPDE:DNA adducts in white blood cells from two occupational groups. In roofers and foundry workers, 7 of 28 and 7 of 20 samples, respectively, were positive for BPDE:DNA adducts (range, 2 to 120 fmol BPDE/50 µg DNA). In a group of nine volunteers without industrial exposure to BaP, the two positive DNA samples were from cigarette smokers. Control DNA obtained from human lymphocyte cell line RPMI 4265 was negative. These results indicate that metabolic activation of BaP and formation of BPDE:DNA adducts occurs in humans. (Auth. Abs. Mod.)

86–0093. Silber, W. **Carcinoma of the Oesophagus: Aspects of Epidemiology and Aetiology.** *Proceedings of the Nutrition Society* 44(1):101-110, February 1985.

The etiology of esophageal cancer is multifactorial, but tobacco and alcohol are common factors in high, moderate, and low incidence areas. Cancer of the esophagus has a pattern of incidence that can vary 500-fold from one area to another, from one country to another, and between ethnic groups in the same country. Although there is no doubt about the association between smoking and esophageal cancer, combined tobacco and excessive alcohol intake are considered the chief contributory factors in Western countries. All types of tobacco appear to produce the same result. A Swedish study showed that in one sample of patients, 51 percent smoked cigarettes, 18 percent used pipes, and 15 percent smoked cigars. However, the tobacco curing process, tar yield, and other variables may all influence the eventual outcome. Also explored are the etiological roles of occupational exposure, alcohol consumption, vitamins and other components of the diet, environmental factors such as nitrosamine contamination, genetic predisposition, sex, age, race, and predisposing lesions. Temporal trends in incidence, international variation in prevalence, and implications for primary prevention are discussed.

86–0094. Solli, H.M.; Andersen, A.; Stranden, E., et al. **Cancer Incidence Among Workers Exposed to Radon and Thoron Daughters at a Niobium Mine.** *Scandinavian Journal of Work, Environment and Health* 11(1):7-13, February 1985.

Associations between lung cancer and exposure to alpha radiation and smoking were found in an investigation of 318 male employees of a niobium mining company that operated between 1951 and 1965. A lifetime dose in grams calculated for each smoker (identified as light, medium, or heavy) showed increasing lung cancer with increasing tobacco use. Many of the workers, especially underground miners, were exposed to radon daughters and thoron and also to thorium. Accumulated doses from short-lived radon and thoron daughters were found to be relatively low (≤ 300 working months). During the followup period (1953 to 1981), 24 new cases of cancer were observed compared with 22.8 expected; 12 cases of lung cancer had occurred (3.0 expected). Among 77 miners, 9 cases of lung cancer were observed (0.8 expected). For radon and thoron daughter exposure, about 50 excess cases per million person-years at risk per working-level month were observed. (Auth. Abs. Mod.)

86–0095. Stjernsward, J.; Stanley, K.; Eddy, D., et al. **Cancer Control: Strategies and Priorities.** *World Health Forum* 6(2):160-164, 1985.

Worldwide, tobacco use and cancer are significantly linked, and more than half of the 4.3 million annual cancer-related deaths occur in developing countries. In people over 5 years of age, cancer is one of the most frequent causes of death in both developed and undeveloped countries. Among males, tobacco-related lung cancer and oral cancer are the most common. Cancer control programs are designed to (1) prevent cancers from occurring, (2) reduce morbidity and mortality from cancers that do occur, and (3) provide optimum care to cancer patients. Successful programs are commonly run by a national committee under a coordinator or director, and are implemented through existing health care systems. Primary prevention, which offers the greatest hope for reducing cancer mortality, is often difficult to implement since it is usually aimed at large populations and costs are high. Effective early detection programs already exist for oral, cervical, and breast cancer, but depend on availability of trained personnel and suitable treatment facilities. Treatment, a third factor, is simplest at the immunization stage, such as against infectious hepatitis B virus, which often leads to liver cancer. Surgery, radiotherapy, and chemotherapy are the best forms of treatment once cancer is diagnosed.

86–0096. Takahashi, A.; Iwasaki, I.; Ide, G. **Effects of Minute Amounts of Cigarette Smoke With or Without Nebulized N-Nitroso-N-Methylurethane on the Respiratory Tract of Mice.** *Japanese Journal of Cancer Research* 76(5):324-330, May 1985.

Minute amounts of cigarette smoke in combination with carcinogens may be cocarcinogenic according to a study on the effects of cigarette smoke with or without nebulized N-nitroso-N-methylurethane (NMUT) on the respiratory epithelia of mice. Squamous cell carcinoma may pass through the course of basal cell hyperplasia, squamous metaplasia, and dysplastic change of epithelia. Groups of mice were treated with (1) NMUT nebulization and cigarette smoke, (2) NMUT nebulization only, (3) cigarette smoke only, and (4) no treatment. In the first group, squamous cell carcinomas were found in the nasal cavity (4 of 10 mice), trachea (4 of 10), and lung (2 of 10). In the second group, squamous cell carcinomas with keratosis were found in the nasal cavity (2 out of 10 mice) and in the lung (1 out of 10 mice), including basal cell hyperplasias, squamous metaplasias, and dysplastic changes. The third group showed basal cell hyperplasias and squamous metaplasias in the nasal cavity and hypertrophy of Clara cells. No marked changes of epithelia were seen in the fourth group, nor were adenomas or adenocarcinomas found in any group. Statistically, there was a significant difference between group 1 and group 2 in incidence of dysplastic changes in trachea ($p<0.05$). (Auth. Abs. Mod.)

86–0097. Triano, E.A.; Simpson, J.B.; Kratky, M., et al. **Protective Effects of Trifluralin on Benzo(*a*)pyrene-Induced Tumors in A/J Mice.** *Cancer Research* 45(2):601-607, February 1985.

Trifluralin started in the diet after administration of a carcinogen protects against benzo(*a*)pyrene (BaP) tumorigenesis, demonstrating a suppressive effect against BaP-induced tumors. Trifluralin, a widely used herbicide, added to the diet before p.o. administration of BaP and fed continously, significantly inhibited induction of lung and forestomach tumors in female A/J mice. Dietary intake of trifluralin before administration of BaP significantly increased glutathione in lung and forestomach, but not in liver and glandular stomach. Trifluralin treatment also inhibited binding of (^{3}H)BaP to liver and lung DNA, and to protein in liver. Under these conditions, protection against BaP-induced lung tumors and perhaps forestomach tumors may be due to an elevation of tissue glutathione, resulting in a decreased binding of reactive metabolites of BaP to macromolecules at these sites. Results indicate that trifluralin has a "blocking" effect in its inhibition of BaP-induced tumors. Trifluralin also inhibits chemical carcinogenesis in lung and forestomach when started in the diet 1 day after administration of BaP and fed continuously thereafter. Although inhibition of tumors occurred when trifluralin was started 1 day after BaP, there was significant protection at all time intervals (0 to 7 days) against lung tumors.

86–0098. Vena, J.E.; Byers, T.E.; Cookfair, D., et al. **Occupation and Lung Cancer Risk. An Analysis by Histologic Subtypes.** *Cancer* 56(4):910-917, August 15, 1985.

The relationships between cigarette use, occupational exposures, dietary vitamin A, and lung cancer were examined in 1,002 white male lung cancer patients (aged 35 to 79) and 1,119 controls. Among the patients, who had been admitted to Roswell Park Memorial Institute between 1957 and 1965, 464 cases were classified as squamous, small cell, or adenocarcinoma. Although each displayed a statistically significant trend of increasing risk associated with increasing cigarette consumption, the strongest relationship was seen for small cell carcinoma (odds ratio for ≥ 40 pack-years, 17.5) and the weakest with adenocarcinoma (odds ratio for ≥ 40 pack-years, 6.7). Increasing risk for squamous cell cancer was seen with increasing duration of exposure to all lung carcinogens, asbestos, and aromatic hydrocarbons. Small cell carcinomas were not associated with any of the occupational exposure categories studied, with the exception of asbestos exposure in light smokers. Increasing risk of adenocarcinoma was seen with increasing duration of employment in occupations with potential exposure, but only for light smokers. Dietary vitamin A consumption did not confound occupational associations. Hypotheses were generated regarding the interplay of these risk factors in the etiology of different histologic subtypes of lung cancer. (Auth. Abs. Mod.)

86–0099. Winn, D.M. **Tobacco Chewing and Snuff Dipping: An Association With Human Cancer.** In: O'Neill, I.K.; Von Borstel, R.C.; Miller, C.T., et al. (Editors). *N-Nitroso Compounds: Occurrence, Biological Effects and Relevance to Human Cancer.* IARC Scientific Publication No. 57, Geneva, IARC, 1984, pp. 837-849.

A review of the epidemiological evidence linking the use of smokeless tobacco to oral cancer concludes that the evidence is convincing. However, although the carcinogenicity of chews that include tobacco as only one component is firmly established, more research is needed to clarify the risks of oral cancer from tobacco chewing in the United States and other populations. As yet, little evidence exists regarding the effects of smokeless tobacco on anatomical sites outside the oral cavity, although preliminary evidence suggests that smokeless tobacco use may increase risks for esophageal cancer. It will also be important to examine the effect of factors such as smoking, alcohol, and diet, which may modify the risk of cancer from smokeless tobacco, and to determine whether cessation of the habit is associated with a reduced risk of cancer. While oral cancer associated with smokeless tobacco has a long latent period, the use of these products by young people who could accumulate decades of exposure should be actively discouraged. The pathological features of oral cancer and prevalence of leukoplakia in smokeless tobacco users, smokeless tobacco habits in Asia, and probable mechanisms of carcinogenesis are also discussed. (Auth. Abs. Mod.)

86–0100. Zeller, W.J.; Schmahl, D. **Etiology of Small Cell Lung Carcinoma.** *Recent Results in Cancer Research* 97:1-10, 1985.

A review of the literature shows that smoking, radiation, asbestos, and chemical carcinogens are specific etiologic risk factors for small cell lung carcinoma (SCLC). Frequency of three principal types of epithelial changes (increase in number of cell rows, loss of cilia, and presence of atypical cells) were found to be highly correlated with number of cigarettes smoked. Following smoking cessation, epithelial lesions were reduced to 66.6 percent in ex-smokers compared with 97.8 percent in current smokers. Atypical nuclei were found in 50 percent of ex-smokers vs. 100 percent of current smokers. In a case—control study with access to the Third National Cancer Survey, cigarette smoking was significantly associated with squamous cell, small cell, and adenocarcinoma, with SCLC having the strongest relationship. In another study of 40 lung cancer patients below the age of 40 (two-thirds with SCLC), only 4 patients were nonsmokers. Lung cancer among heavy smokers with heavy radiation exposure was about 10 times that of nonsmokers with heavy radiation exposure, but 67 times that of nonsmokers with low radiation exposure. Cigarette smokers who work with asbestos are 92 times more likely to die of bronchogenic carcinoma than nonexposed nonsmokers. Exposure to compounds of proven carcinogenity for human lung tissue are also documented.

NON—NEOPLASTIC RESPIRATORY DISEASES

86–0101. Agnew, J.E.; Pavia. D.; Clarke, S.W. **Factors Affecting the "Alveolar Deposition" of 5 μm Inhaled Particles in Healthy Subjects.** *Clinical Physics and Physiological Measurement* 6(1):27-36, February 1985.

At any given flow rate, alveolar deposition (AD) values in smokers were significantly lower ($p<0.01$) than in nonsmokers. AD (24-hour retention) was measured with $^{99}\mathrm{Tc}^{m}$-labeled, 5 μm-diameter polystyrene particles that were inhaled at various flow rates. A postinspiratory breathhold of 3 seconds maximized AD efficiency. In 32 tests on young nonsmokers (age ≤ 30 years), AD was significantly related to flow rate ($r=0.61$, $p<0.001$). Intersubject variability about the regression line was not related to variability of airway caliber as detected by conventional spirometry. Significant dependence of AD on flow rate but not lung function was found in young asymptomatic cigarette smokers and in older nonsmokers. In older smokers (age >30 years) dependence on flow rate was significant, but dependence on lung function was equivocal. Smoking was associated with decreased AD. A considerable intersubject variability of AD could not be attributed to variability of inhalation conditions or lung function. Therefore, AD should be measured directly whenever possible in occupational hygiene assessments and clinical aerosol applications. (Auth. Abs. Mod.)

86–0102. Au, W.Y.W.; Dutt, A.K.; DeSoyza, N. **Theophylline Kinetics in Chronic Obstructive Airway Disease in the Elderly.** *Clinical Pharmacology and Therapeutics* 37(4):472-478, April 1985.

Elderly nonsmokers (aged >60 years) with chronic obstructive airway disease (COPD) cleared theophylline more slowly than middle-aged nonsmokers (aged 50 to 60 years) with COPD. Theophylline kinetic studies, serial spirometric function tests, and arterial blood gas determinations were performed in 39 adult men with stable COPD. Subjects were given an intravenous aminophylline loading dose of 5.6 mg/kg and a maintenance dose of 0.9 mg/kg/hour for 6 hours. The higher clearance rates found for smokers are consistent with the reported stimulatory effect of cigarette smoking on theophylline metabolism. Elderly nonsmokers had 36 percent lower theophylline clearance and 40 percent longer serum theophylline elimination than middle-aged nonsmokers. Differences in theophylline clearance and theophylline elimination were found between elderly and middle-aged subjects in both smoking and nonsmoking groups. Consistent improvement in spirometric functions was observed in both elderly smokers and nonsmokers for forced expiratory volume in 1 sec, forced vital capacity, forced expiratory flow at 25 to 75 percent of vital capacity, and maximum mid-flow time.

86–0103. Baker, E.L.; Dagg, T.; Greene, R.E. **Respiratory Illness in the Construction Trades. I. The Significance of Asbestos-Associated Pleural Disease Among Sheet Metal Workers.** *Journal of Occupational Medicine* 27(7):483-489, July 1985.

Logistic regression analysis showed that smoking increases the effect of asbestos in causing pleural disease, but does not appear to cause pleural disease in the absence of asbestos exposure. To assess roentgenographic and lung function abnormalities in asbestos-exposed construction workers, 314 white male sheet metal workers (33.4 percent current smokers, 43.5 percent ex-smokers, 23.1 percent never smokers) were analyzed. Pleural abnormalities were common, increasing to approximately 70 percent in workers with more than 30 years of employment. Pleural disease was significantly correlated with decreased forced vital capacity ($p=0.027$) after controlling for cigarette consumption, age, height, and employment duration. In contrast, forced expiratory volume in 1 sec showed a stronger association with amount smoked ($p=0.022$) than with pleural abnormality ($p=0.316$). Within each employment stratum, the prevalence of abnormalities increased with amount smoked. Compared with smokers of 0.5 packs/day, the odds of having pleural disease were 1.31 for those consuming 1.0 packs/day and 2.93 for those consuming 2.5 packs/day. However, the prevalence of pleural abnormalities differed only marginally between smokers, ex-smokers, and never smokers. (Auth. Abs. Mod.)

86–0104. Barter, S.J.; Cunningham, D.A.; Lavender, J.P., et al. **Abnormal Ventilation Scans in Middle-Aged Smokers. Comparison With Tests of Overall Lung Function.** *American Review of Respiratory Disease* 132(1):148-151, July 1985.

Uniformity of regional ventilation during tidal breathing was assessed using continuous inhalation of krypton-81m in 43 male lifelong nonsmokers and 46 male current cigarette smokers (mean consumption 24.1 cigarettes/day). All were between 44 and 61 years of age, with mild or no respiratory symptoms, and all had normal chest radiographs. Results of ventilation scans were compared with tests of overall lung function (including forced expiratory volume in 1 sec (FEV_1), vital capacity (VC), maximal expiratory flow volume (MEFV) curves, and single-breath N_2 test). Diffuse abnormalities were found in 19 smokers (41 percent); none were found in nonsmokers. Focal abnormalities were found in seven smokers and three nonsmokers. Smokers showed expected abnormalities in overall lung function (reduced FEV_1 and VC, increased single-breath N_2 slope, and closing volume); however, in individual smokers there was only a weak relationship between the severity of abnormality of overall lung function and an abnormal ventilation scan. Abnormal scans could be found when overall lung function was normal and were not invariably found when significant abnormalities in FEV_1/VC or N_2 slope were present. There was no relationship between the presence of chronic expectoration and an abnormal scan. The prognostic significance of an abnormal ventilation scan in such smokers remains to be established. (Auth. Abs. Mod.)

86–0105. Binder, R.; Stone, P.J.; Calore, J.D., et al. **Serum Antielastase and Neutrophil Elastase Levels in PiM Phenotype Cigarette Smokers With Airflow Obstruction.** *Respiration* 47:267-277, May 1985.

Cigarette smoking is a major risk factor in the development of pulmonary lesions such as emphysema. Why some smokers develop airflow obstruction while others do not was explored in an assessment of blood factors that might relate to pathogenesis of emphysema in two groups of PiM phenotype volunteers. It has been hypothesized than an imbalance in the elastase-antielastase system may predispose some people to developing the disease. Subjects were matched for age, sex, and total pack-years of cigarette smoking; one group had airflow obstruction and the other did not. Functional levels of α_2-macroglobulin (α_2-M) and α_1-protease inhibitor (α_1-PI) were separately assessed by a protease binding procedure. Neutrophils were isolated from blood by counterflow centrifugation, and elastase content was assayed with ^{3}H-elastin-SDS (sodium dodecyl sulfate). Obstructed and nonobstructed groups did not differ with respect to functional or immunoreactive levels of α_1-PI and α_2-M or elastase levels in neutrophils. No imbalances of circulating elastase or antielastase levels in PiM phenotype smokers with airflow obstruction were found. (Auth. Abs. Mod.)

86–0106. Braman, S.S.; Corrao, W.M. **Chronic Cough. Diagnosis and Treatment.** *Primary Care* 12(2):217-225, June 1985.

Cigarette smoking is the most common cause of persistent cough in adult patients and chronic cough increases with the number of cigarettes smoked. Cough in smokers can be an early symptom of simple chronic bronchitis or even chronic obstructive bronchitis in long-term smokers. Cough in smokers is probably due initially to a direct irritant effect on the tracheobronchial receptors. In chronic smokers, excessive bronchial secretions and airway inflammation are the causes of chronic cough. Smokers who complain of persistent cough should be advised to quit. One study of smokers who quit showed 77 percent had eventual disappearance of cough; 50 percent showed improvement within 1 month of smoking cessation. Smoking is also associated with bronchogenic carcinoma, and a change in the cough habits of patients with chronic bronchitis demands immediate attention, since early detection is, at present, the best means of cure for patients with lung cancer. Other causes of cough, the fifth most common symptom of patients seeking medical attention from a physician, are reviewed, diagnostic procedures are outlined, and treatment options are discussed. In the majority of patients with chronic cough, a diagnosis can be made using simple clinical laboratory procedures in an outpatient setting.

86–0107. Burchfiel, C.M., III. **Passive Smoking, Respiratory Symptoms, Lung Function and Initiation of Smoking in Tecumseh, Michigan.** Doctoral Dissertation, University of Michigan, Ann Arbor, University Microfilms International 84-12111, 1984, 487 pp.

The relationship between passive smoking and respiratory symptoms, history of respiratory illness, and pulmonary function was assessed in 3,608 children and adolescents participating in the Tecumseh Community Health Study. Subjects were eligible if they were aged 0 to 19 years at the first of three examination cycles (1962 to 1965, 1967 to 1969, and 1978 to 1979) and if they completed questionnaires on parental smoking habits. Indices of passive smoke exposure were established by classifying subjects according to the number of household smokers and the duration and amount of smoke exposure. Results suggest that offspring of smokers experience a higher prevalence and incidence of several chronic respiratory symptoms and acute respiratory illnesses and a lower lung function than unexposed offspring. Age-adjusted prevalence rates of phlegm, wheeze, asthma, and colds among males and wheeze, bronchitis, and colds among females were significantly related to the number of parental smokers at baseline. Prevalence rates tended to be higher and lung function lower for children from households where only mothers smoked rather than only fathers. Offspring from households where parents and siblings smoked tended to take up cigarette smoking more frequently than offspring residing in smoke-free households. In general, the magnitude of the observed associations, although significant, was relatively small.

86–0108. Chapman, R.S.; Calafiore, D.C.; Hasselblad, V. **Prevalence of Persistent Cough and Phlegm in Young Adults in Relation to Long-Term Ambient Sulfur Oxide Exposure.** *American Review of Respiratory Disease* 132(2):261-267, August 1985.

An association between prevalence of persistent cough and phlegm (PCP), ambient sulfur oxide exposure, and smoking was found in a 1976 survey of 5,623 young adults in four Utah communities. The influence of tobacco use on PCP prevalence was larger than that of any of the other variables. Over the previous 5 years, community-specific mean sulfur dioxide levels had been 11, 18, 36, and 115 $\mu g/m^3$. Corresponding mean suspended sulfate levels had been 5, 7, 8, and 14 $\mu g/m^3$. No intercommunity exposure gradient of total suspended particulates or suspended nitrates was observed. In nonsmoking mothers, PCP prevalence was 4.2 percent in the high-exposure community and approximately 2.0 percent in all other communities. In mothers who smoked, PCP prevalence was 21.8 percent in the high-exposure community and approximately 15.0 percent elsewhere. In nonsmoking fathers, PCP prevalence was 8.0 percent in the high-exposure community and averaged 3.0 percent elsewhere. In smoking fathers, PCP prevalence was less strongly associated with ambient sulfur oxide exposure. Intercommunity prevalence differences in smoking and nonsmoking mothers, and in nonsmoking fathers, were significant at alpha = 0.05. A categorical logistic regression model, testing simultaneously for effects of community and several covariates on PCP prevalence, yielded similar results. (Auth. Abs. Mod.)

86–0109. Copes, R.; Thomas, D.; Becklake, M.R. **Temporal Patterns of Exposure and Nonmalignant Pulmonary Abnormality in Quebec Chrysotile Workers.** *Archives of Environmental Health* 40(2):80-87, March-April 1985.

Questionnaire, radiographic, and lung function information was collected from 983 Quebec chrysotile workers, and regression analyses revealed that airflow limitation and chronic bronchitis were related to cumulative smoking history ($p < 0.05$) and to average dust level and dust exposure load over time. Smoking was not significantly associated with parenchymal fibrosis, pleural fibrosis, or airway reactivity in this population. The main objective was to determine if temporal patterns of exposure to asbestos particles have an influence on exposure—response relationships for nonmalignant respiratory tract changes; therefore, only general conclusions on the influence of smoking were possible. Data obtained from these workers were used to develop the five clinical response scales described. The relationship of these scales to variables describing temporal patterns of dust exposure was studied, accounting for cumulative dust exposure, age, and smoking history. For pulmonary fibrosis, the strongest relationships were to cumulative dust exposure; for pleural fibrosis, to exposure peaks and residence time of dust in the lung; and for airway reactivity, to early and recent dust exposure. Results add to previous evidence that exposures to environments containing airborne asbestos may result in airway abnormalities.

86–0110. Gant, V.A.; Hamblin, A.S. **Human Bronchoalveolar Macrophage Heterogeneity Demonstrated by Histochemistry, Surface Markers and Phagocytosis.** *Clinical and Experimental Immunology* 60(3):539-545, June 1985.

Human alveolar macrophages (AM) obtained by bronchoalveolar lavage from 18 patients with a variety of conditions showed (1) staining for nonspecific esterase (NSE) and acid phosphatase (ACP); (2) in vitro phagocytosis of *Candida guillermondii*; (3) expression of cell surface markers detected by two monoclonal antibodies (MoAb 1B5 and DA2) and two antimonocyte/macrophage MoAb (UCHMI and RFD2); and (4) simultaneous phagocytosis of *C. guillermondii* and staining with MoAb. It was noted that not all AM recovered from smokers contained phagocytosed tar particles. A proportion of AM had clear cytoplasm and therefore lacked evidence of in vivo phagocytic activity by light microscopy. The majority of AM in all patients were found to be Ia positive (90±10 percent), ACP positive (100 percent), and NSE positive (97±4 percent). There were no significant differences in expression of Ia in patients with differing smoking habits (1B5, 93±6 percent in smokers and 95±8 percent in nonsmokers; DA2, 85±9 percent in smokers and 91±8 percent in nonsmokers). A smaller proportion were UCHM1 and RFD2 positive (77±11 percent and 68±12 percent, respectively) and less were phagocytic (37±17 percent). While the total percentage of cells staining with MoAb was unaltered by phagocytosism, the proportion of UCHM1 or RFD2 positive cells was significantly higher in phagocytic population than in nonphagocytic population (90 and 85 percent compared with 65 and 55 percent, respectively, $p<0.001$). Only a proportion of Ia-positive AM expressed monocyte/macrophage antigens and were phagocytic. Heterogeneity may reflect different stages of macrophage maturation or the existence of macrophage subpopulations with functionally distinct roles in airways immunity. (Auth. Abs. Mod.)

86–0111. Hartiala, J.J.; Mapp, C.; Mitchell, R.A., et al. **Nicotine-Induced Respiratory Effects of Cigarette Smoke in Dogs.** *Journal of Applied Physiology* 59(1):64-71, July 1985.

Results from canine smoke inhalation studies indicate that a significant portion of bronchoconstriction caused by the inhalation of cigarette smoke is due to (1) blood-borne nicotine acting on medullary nicotinic-like receptors that stimulate the central respiratory pattern generators, and (2) direct stimulation of airway parasympathetic ganglia. Cigarette smoke was introduced into the lungs of donor dogs and arterial blood was removed and injected into recipient dogs to determine if a blood-borne material increased breathing and smooth muscle tone. Smoke from cigarettes containing 2.64 mg nicotine was effective in eliciting these responses, but smoke from cigarettes containing 0.42 mg nicotine was not. Nicotine, in doses comparable with amounts absorbed from smoke, also increased breathing and tracheal smooth muscle tension when injected into the vertebral circulation of recipient dogs. Blockade of nicotine receptors in the central nervous system and in the airway parasympathetic ganglia inhibited the effects of inhaled cigarette smoke and intravenous nicotine on the respiratory center and on bronchomotor tone. It is concluded that nicotine absorbed from smoke is the main cause of cigarette smoke-induced bronchoconstriction. (Auth. Abs. Mod.)

86–0112. Hulbert, W.M.; McLean, T.; Hogg, J.C. **The Effect of Acute Airway Inflammation on Bronchial Reactivity in Guinea Pigs.** *American Review of Respiratory Disease* 132(1):7-11, July 1985.

Airways reactivity in Camm-Hartley guinea pigs was measured and compared before and after an inflammatory response was induced by exposure to cigarette smoke. Airways reactivity, determined as the response to graded doses of histamine, was measured in 24 animals without drug pretreatment, in 17 pretreated with propranolol, in 17 pretreated with atropine, and in 18 pretreated with both atropine and propranolol. In each group, at least 5 animals not exposed to cigarette smoke served as controls, and the remaining animals were studied in groups of 4 or more at 30 minutes, 6 hours, and 24 hours after exposure to 100 puffs of whole cigarette smoke. Data show that airways reactivity was increased at 30 min but not at 6 and 24 hr after exposure to cigarette smoke. Pretreatment with propranolol or the combination of propranolol and atropine prior to the histamine dose—response curve did not affect the increased response seen after cigarette smoke exposure, but pretreatment with atropine abolished it. Comparison of results with previous histologic studies of airways in similarly exposed animals suggests that the observed increase in airways reactivity occurs during the fluid exudative phase of the inflammatory response before the polymorphonuclear leukocytes migrate into the epithelium. Further studies are required to determine the precise changes that are responsible for the increased airways response following smoke exposure. (Auth. Abs. Mod.)

86–0113. Janoff, A. **Elastases and Emphysema. Current Assessment of the Protease-Antiprotease Hypothesis.** *American Review of Respiratory Disease* 132(2):417-433, August 1985.

Attempts to link cigarette smoking to the development of emphysema at the chemical and cellular level have focused on (1) recruitment of elastase-producing leukocytes to the lungs of smokers; (2) inactivation of lung elastase inhibitors by tobacco products or by metabolites released from tobacco-stimulated lung cells; and (3) interference with elastin neosynthesis (repair) in smokers. Additional information is also available concerning the biochemical properties of neutrophil and macrophage elastases, although it is still unclear which of these enzymes plays the predominant role in smoking-related chronic lung injury. In animal models, elastase-induced lesions are increased by lathyrogens or by exposure to cigarette smoke. Animal experiments, which have focused attention on repair processes in the lung, have shown that such processes may exert a major influence on the outcome of the initial proteolytic insult. Human studies exploring correlations between elastase levels in neutrophils or serum and development of disease have provided conflicting data; however, measurement of enzymes in pulmonary secretions have yielded more suggestive results. Assessments of lung elastase inhibitors in humans continue to support the importance of α_1-proteinase inhibitor in the protection of the lower respiratory tract, but newer information on locally produced low molecular weight elastase inhibitors indicates that these, too, may play a significant role. Perhaps the greatest advance in the the study of emphysema involves new discoveries concerning the structure and function of the α_1-proteinase (elastase) inhibitor. Applications of recombinant DNA technology and genetic engineering have made it possible to design modified inhibitors with striking new properties. These agents may enjoy significant clinical application in the not too distant future. (Auth. Abs. Mod.)

86–0114. Kilburn, K.H.; Warshaw, R.; Thornton, J.C. **Pulmonary Functional Impairment and Symptoms in Women in the Los Angeles Harbor Area.** *American Journal of Medicine* 79:23-28, July 1985.

A powerful factor postulated as oxidant air pollution that is additive with and resembles the effect of cigarette smoking has affected expiratory air flow and distribution of gas, resulting in altered single-breath diffusing capacity for carbon monoxide (CO) and alveolar volume in wives and daughters of Long Beach area shipyard workers. Spirometric measurements of vital capacity and flow rates, thoracic gas volume, and single-breath diffusing capacity for CO were obtained for 360 white women, 238 wives (age 58 years) and 122 daughters (age 32 years) of shipyard workers. Values for nonsmokers, ex-smokers, and current smokers were compared with smoking-specific mean values, age- and height-adjusted, from a reference population in Michigan. Wives from Long Beach had significantly lower mid and terminal flows, single-breath diffusing capacity for CO, and alveolar volume, except that single-breath diffusing capacity for CO was not significantly lower in current smokers. Nonsmokers and ex-smokers showed significantly different values for forced expiratory volume in 1 sec in addition to flow rates and single-breath diffusing capacity for CO. Daughters showed significant reductions in single-breath diffusing capacity for CO and alveolar volume, attributed to maldistribution of inspired gas. (Auth. Abs. Mod.)

86–0115. Kilburn, K.H.; Warshaw, R.; Thornton, J.C. **Asbestosis, Pulmonary Symptoms and Functional Impairment in Shipyard Workers.** *Chest* 88(2):254-259, August 1985.

The shipyard workers studied had minimal to moderate asbestosis with evidence of pleural disease but little functional impairment. Respiratory symptoms and lung function of the 339 male workers were compared with data on a smoking-specific reference population essentially free of asbestosis. Function in nonsmokers was not significantly different from the reference population except for alveolar volume; however, ex-smokers had significantly reduced forced expiratory volume in 1 sec, flow rates, single-breath diffusing capacities for carbon monoxide (Dsb), and alveolar volume. Forced vital capacity and thoracic gas volume were normal. Shipyard workers who smoked resembled reference smokers except for significantly reduced alveolar volume. Of the total, 288 had begun working in shipyards at least 20 years earlier and had satisfactory chest x-ray findings, 257 underwent spirometric testing, and DsB was determined in 199. Of the 64 percent with radiographic signs of asbestosis, 28 percent had parenchymal disease only, 37 percent had pleural disease only, and 35 percent had both. There was pleural calcification in 9 percent. In only 14 (8 percent) was profusion of opacities greater than 1/1 by International Labor Organization's criteria. Age was closely related to duration of asbestos exposure. (Auth. Abs. Mod.)

86–0116. Kohn, H.; Klech, H.; Angelberger, P., et al. **Dry Aerosol of Monodisperse Millimicrospheres for Ventilation Imaging: Production, Delivery System, and Clinical Results in Comparison With 81m-Krypton and 127-Xenon.** *European Journal of Nuclear Medicine* 10(9/10):411-416, May 1985.

Monodisperse human albumin millimicrospheres (diameter $< 1\ \mu m$) labeled with ^{99m}Tc were nebulized into a dry aerosol to yield approximately 25 percent lung delivery efficiency. In 48 patients (smokers and nonsmokers) with and without varying degrees of chronic obstructive lung disease, quantitative comparison with ^{81m}Kr (penetration index, regional distribution of activity in lungs) demonstrated similar penetration of particles to lung periphery ($r=0.89$ and $r=0.94$, respectively). To assess any possible behavioral differences of aerosol in smokers, visual inspection, calculation of regional activity distribution, and penetration indices of images obtained with aerosol immediately after inhalation and 1 hour later were performed in four healthy nonsmokers and four smokers. No quantitative or qualitative differences could be detected. Semiquantitative scoring of hot spots as a substrate of local turbulent airflow showed a close inverse correlation ($r=-0.82$) with forced expiratory volume in 1 sec, providing additional information about severity of airway obstruction. In 24 patients with suspected pulmonary embolism, complete agreement between aerosol and ^{81m}Kr images was found. For same-day ventilation/perfusion studies, labeling with ^{111}In yielded images of comparable quality to those obtained with ^{99m}Tc-labeled aerosol. (Auth. Abs. Mod.)

86–0117. Lee, L.-Y.; Morton, R.F.; Frazier, D.T. **Influence of Nicotine in Cigarette Smoke on Acute Ventilatory Responses in Awake Dogs.** *Journal of Applied Physiology* 59(1):229-236, July 1985.

Results suggest that nicotine is responsible for elicitation of both immediate and delayed ventilatory responses to inhaled cigarette smoke generated under experimental conditions. To determine whether acute ventilatory responses to inhaled cigarette smoke are affected by a difference in nicotine level, control cigarettes (low-nicotine research cigarettes) were laced with nicotine to generate a mean increase of 330 percent in nicotine content with little or no change in levels of other smoke constituents. Acute ventilatory responses to control and nicotine-laced cigarettes were determined and compared in six awake physically trained dogs. Spontaneous inhalation of nicotine-laced cigarette smoke via a tracheostomy tube caused distinct and consistent changes in breathing patterns on the first or second breath of inhaled smoke: apnea in three dogs, augmented inspiration in two dogs, and rapid shallow breathing in one dog. No significant change in breathing pattern was found immediately following inhalation of smoke from control cigarettes, but both types of cigarettes caused delayed hyperpnea. However, the increase in minute ventilation induced by nicotine-laced cigarettes (from a baseline of 2.8 to a peak of 25.7 L/min) was significantly greater than that induced by control cigarettes (from 2.9 to 5.5 L/min). (Auth. Abs. Mod.)

86–0118. Martin, T.R.; Raghu, G.; Maunder, R.J., et al. **The Effects of Chronic Bronchitis and Chronic Air-Flow Obstruction on Lung Cell Populations Recovered by Bronchoalveolar Lavage.** *American Review of Respiratory Disease* 132(2):254-260, August 1985.

Among 48 male patients (28 smokers and 20 ex-smokers abstinent for at least 2 months) examined for the effects of cigarette smoking, chronic bronchitis, and chronic air flow obstruction on bronchoalveolar lavage cell populations, current cigarette use correlated positively with the proportion of macrophages, but not of neutrophils. It is noted that those with the most impaired lung function were most likely to have quit smoking. An elevated percentage of neutrophils (≥ 10 percent) was found in 16 patients. Of these, 14 had chronic cough and/or phlegm production, but only 9 met criteria for definite chronic bronchitis. Patients with moderate or severe air flow obstruction, defined spirometrically, had significantly greater percentages of lavage neutrophils and lower percentages of macrophages than patients with mild or no air flow obstruction. Data indicate that patients with chronic cough and/or phlegm production and chronic air flow obstruction may have increased proportions of neutrophils in bronchoalveolar lavage fluid in the absence of diffuse parenchymal lung disease or infections. The percentage of neutrophils declined and the percentage of macrophages increased in sequential aliquots. Since most neutrophils are found in the first lavage aliquot, exclusion of the first aliquot from cellular analysis may reduce the effects of these variables. (Auth. Abs. Mod.)

86–0119. Matulionis, D.H.; Kimmel, E.; Diamond, L. **Morphologic and Physiologic Response of Lungs to Steroid and Cigarette Smoke: An Animal Model.** *Environmental Research* 36(2):298-313, April 1985.

Combined effects of cigarette smoke inhalation and hydrocortisone acetate (HCA) treatment induced the following prominent abnormalities in lungs of C57BL/6 male mice: (1) marked reduction of pulmonary macrophage population normally elevated by smoke inhalation; (2) accumulation of surfactant and flocculent material in alveoli; (3) decrease in alveolar space surrounded by normal septal tissue; and (4) increase in hypertrophied alveolar parenchyma. Concomitant with altered lung morphology, lung volume and gas diffusing capacity were significantly compromised in smoke-exposed animals treated with steroids. Smoke inhalation or HCA administration alone had no ill effects. Data indicate that the manifestation of pathologic conditions resembling pulmonary fibrosis and pulmonary alveolar proteinosis was a result of cigarette smoke—drug interaction. The information provides a basis for an animal model applicable to assessing factors related to smoke inhalation and development of pulmonary disorders. (Auth. Abs. Mod.)

86–0120. Morton, A.R.; Holmik, E.V. **The Effects of Cigarette Smoking on Maximal Oxygen Consumption and Selected Physiological Responses of Elite Team Sportsmen.** *European Journal of Applied Physiology and Occupational Physiology* 53(4):348-352, 1985.

The acute and chronic effects of cigarette smoking on selected physiological responses were determined in seven physically well-trained nonsmokers and seven well-trained habitual smokers. Nonsmokers and smokers did not differ significantly with respect to maximal oxygen consumption. The acute effect of smoking two cigarettes immediately prior to a graded exercise stress test on a treadmill ergometer did not significantly alter the maximal oxygen consumption of either group; values for smokers decreased from 57.90 to 55.64 mL/kg/min and those for nonsmokers decreased from 58.62 to 57.86 mL/kg/min. The time taken for nonsmokers to reach exhaustion decreased significantly between the pre-exercise nonsmoking and smoking conditions (mean, 0.64 min; $p<0.05$). Smokers had lower scores for forced vital capacity (FVC) and forced expiratory volume in 1 sec (FEV_1) than nonsmokers. Only the mean FVC of smokers recorded 5 minutes postexercise was significantly altered by pre-exercise smoking. No differences were found in the resting heart rates (HR) of nonsmokers and smokers. Smoking two cigarettes significantly increased the mean resting HR of smokers and nonsmokers by 15.8 and 15.6 beats/min, respectively ($p<0.01$). No alteration in the exercise HR was found in either group under smoking conditions. (Auth. Abs. Mod.)

86–0121. Myers, J.E.; Garisch, D.; Myers, H.S., et al. **A Respiratory Epidemiological Study of Stevedores Intermittently Exposed to Asbestos in a South African Port.** *American Journal of Industrial Medicine* 7(4):273-283, 1985.

Data showed that 30 percent of the stevedores surveyed (155 smokers, 30 nonsmokers, and 18 ex-smokers), who intermittently transported crocidolite asbestos in a South African port, had asbestosis. Diagnostic criteria are discussed in terms of low index of suspicion for industrial diseases, high probability of missing slight radiological changes, and attribution of radiological lesions to other diseases, particularly tuberculosis, in a high prevalence area. Smoking was not significantly associated with asbestosis, other respiratory signs and symptoms, or radiological abnormality. However, the relation between profusion category and smoking, with age and length of service as covariates, produced a higher adjusted group mean for nonsmokers than for smokers, but the difference did not reach significance. Results also indicate that asbestosis was not associated with tuberculosis. (Auth. Abs. Mod.)

86–0122. Rhodes, A.; Guy, G.W.; Allen, E. **Phyllocontin and Phyllocontin Forte Continus Tablets: Dose—Response Relationship.** In: *New Perspectives in Theophylline Therapy.* Royal Society of Medicine International Congress and Symposium Series, No. 78. London, Royal Society of Medicine, 1984, pp. 289-296.

Smokers exhibited lower plasma theophylline concentrations than nonsmokers for the same dose in an assessment of intersubject variation in theophylline clearance rates, suggesting that patients who smoke require higher doses of theophylline than nonsmokers. Twenty healthy adult smokers and nonsmokers were administered Phyllocontin and Phyllocontin Forte tablets twice/day according to a sequential design. Phyllocontin (225 mg) Continus tablets have been commercially available in the United Kingdom since 1974 and are a major prophylactic treatment for patients with chronic obstructive airways disease. When steady state conditions had been achieved, plasma samples were examined for theophylline content over one dosage interval. Phyllocontin Forte Continus tablets were shown to be bioequivalent to Phyllocontin Continus tablets with respect to extent of absorption. An increase in total theophylline dose was associated with a linear increase in plasma theophylline concentration. (Auth. Abs. Mod.)

86–0123. Schmid, R.P.; Wangensteen, D.; Hoidal, J., et al. **Effects of Elastase and Cigarette Smoke on Alveolar Epithelial Permeability.** *Journal of Applied Physiology* 59(1):96-100, July 1985.

Alveolar epithelial permeability X surface area (PS) for (^{14}C) sucrose and (^{125}I) bovine serum albumin (^{125}I-BSA) was determined in isolated perfused lungs from hamsters previously exposed to porcine pancreatic elastase (PPE) and/or cigarette smoke to investigate whether exposure conditions known to result in the development of severe emphysema also cause increases in alveolar epithelial permeability. Saline (0.5 mL) with 0, 5, or 20 units PPE was intratracheally instilled in anesthetized hamsters. Animals exposed to smoke for 4 to 6 weeks received 0 or 5 units and nonexposed animals received 0, 5, or 20 units. PS was measured in smoke-exposed hamsters 3 hours after PPE instillation and in nonsmoking hamsters 3 hours, 24 hours, or 5 days later. Control PS values were 0.84 ± 0.11 and 0.030 ± 0.006 cm^3/sec X 10^{-4}, respectively, for sucrose and BSA. Following instillation of 20 units PPE, $(PS)_{SUCROSE}$ was twice the control value at 3 and 24 hours and $(PS)_{BSA}$ was four times the control value at 3 hours. Five units PPE or smoke exposure alone did not cause PS changes. Smoke exposure and 5 units PPE caused $(PS)_{SUCROSE}$ to increase markedly (1.85 ± 0.32); $(PS)_{BSA}$ was not significantly increased (0.076 ± 0.026). Therefore, instilled PPE causes reversible increases in alveolar epithelial PS that are potentiated by cigarette smoking. (Auth. Abs. Mod.)

86–0124. Smith, S.F.; Guz, A.; Cooke, N.T., et al. **Extracellular Elastolytic Activity in Human Lung Lavage: A Comparative Study Between Smokers and Nonsmokers.** *Clinical Science* 69(1):17-27, July 1985.

Emphysema, a disease common among tobacco smokers, is believed to be initiated by unrestrained proteolysis in the lung; however, few studies have found extracellular protease activity in human lung lavage. Elastase and serine protease activities were routinely measured in bronchoalveolar lavage supernatants (BAL) from patients. Smokers have significantly more elastolytic activity (against insoluble (^{3}H)-elastin) in lavage than nonsmokers, but no significant difference was found when the levels of serine proteolytic activity (against *N*-succinyl-L-trialanyl-*p*-nitroanilide) were compared. The elastolytic component of protease activity in nonsmokers' BAL rose from 5 to over 30 percent in smokers, suggesting that elastase activity is selectively enhanced by smoking. Lavages from most smokers indicated that 80 percent or more of elastase activity was serine dependent, whereas lavages from nonsmokers contained variable proportions of serine elastase. Both α_1-proteinase inhibitor and low molecular weight antiprotease (bronchial mucus proteinase inhibitor) were detectable in lavage samples, the latter contributing up to 76 percent of total antiprotease quantified in lavage. Functional antiprotease was detected in 85 percent of lavages. It is concluded that imbalance in protease/antiprotease profiles in lungs of smokers results from enhancement of protease, specifically of elastolytic activity, rather than reduction in inhibitory capacity.

86–0125. Snider, G.L.; Kleinerman, J.; Thurlbeck, W.M., et al. **The Definition of Emphysema. Report of a National Heart, Lung, and Blood Institute, Division of Lung Diseases Workshop.** *American Review of Respiratory Disease* 132(1):182-185, July 1985.

The workshop reviewed the current status of the definition and classification of emphysema and other conditions in humans characterized by enlargement and destruction of respiratory airspaces resulting from cigarette smoking, occupational or environmental exposures, or hereditary α_1-protease inhibitor deficiency. The American Thoracic Society (ATS) definition of emphysema was retained, but with the qualification that obvious fibrosis should be absent. Since the term "destruction," which occupies a central place in the ATS definition, has no clear definition or diagnostic criteria, it was agreed that destruction in emphysema would be defined as nonuniformity in the pattern of respiratory airspace enlargement so that the orderly appearance of the acinus and its components is disturbed and may be lost. Animal models of emphysema are also defined because of concern that criteria for the development of these models have not been universally agreed upon. It is hoped that this nonrestrictive definition will foster development of new knowledge concerning emphysema in humans. Future research should concentrate on early emphysema lesions and those that may precede them. The lungs of young smokers with and without small foci of emphysema would appear to be the best starting material. Several questions to be addressed in future research are suggested.

86–0126. Tabar, A.; Rodriguez, A.; Lobera, T., et al. **Standardized Values of Lower Airway Resistance in Healthy Individuals.** *Allergologia et Immunopathologia* 13(1):23-28, January-February 1985.

Analysis of airway resistance (R_{aw}) using closing pressure methods (APTA (Jaeger) apparatus) found smoking had no influence on resistance in the lower airways. Subjects were 110 males (45 percent smokers) and 68 females (47 percent smokers), with a mean age of 30±11 years. Average R_{aw} was 0.66590±0.26773 Kpc/L/sec^{-1}. In smokers, R_{aw} ranged from 1.26 to 0.17 (mean, 0.61±0.23 Kpc/L/sec^{-1}). In nonsmokers the range was 1.67 to 0.2 (mean, 0.69±0.28 Kpc/L/sec^{-1}). No significant effects were observed for smoking habits, sex, age, weight, or body surface area. However, an inverse correlation was observed between R_{aw} and height ($p<0.05$). A table of normal values of R_{aw} for individuals between 155 and 195 centimeters in height is presented.

86–0127. Taylor, R.F. **The Effect of Nicotine Aerosol on Slowly Adapting Respiratory Stretch Receptors.** Doctoral Dissertation, University of Kentucky, Lexington, University Microfilms International 84-16150, 1984, 142 pp.

The association between cigarette smoke inhalation and apnea observed in anesthetized dogs was studied by determining the response of slowly adapting respiratory stretch receptors (SARSRs) above and below the carina to 1, 2, 4, and 8 percent nicotine or 0.85 percent saline aerosols. Single unit vagal recordings from SARSRs were made from anesthetized, paralyzed, ventilated dogs following aerosol applications. Aerosols were administered separately for five continuous breaths while SARSR activity and transpulmonary pressure (P_{tp}) were recorded. In all instances, introduction of saline aerosols resulted in a decrease in P_{tp} and SARSR activity. Two percent nicotine aerosol resulted in a significant increase in P_{tp} with a concomitant increase in SARSR spikes/burst. A significant portion of the increased SARSR activity was sustained when nicotine-induced pressure changes were reduced by the presence of isoproterenol (i.v. or aerosol). A dose—response effect was demonstrated by varying the nicotine concentration from 1 to 8 percent. SARSRs above the carina demonstrated a greater response to nicotine than those below the carina. It is concluded that nicotine increases SARSR activity by increasing P_{tp} and receptor sensitivity in a dose-related manner. The receptor response may depend on the degree of distensibility of the supporting tissue and whether the local architecture promotes deposition of aerosols. Both factors are related to the location of the receptor along the tracheobronchial tree. (Auth. Abs. Mod.)

86–0128. Taylor, R.G.; Clarke, S.W. **Bronchial Reactivity to Histamine in Young Male Smokers.** *European Journal of Respiratory Diseases* 66(5):320-326, May 1985.

Bronchial reactivity to inhaled histamine was determined in 17 nonasthmatic young male smokers and 21 nonsmokers who were free of airflow obstruction. The two groups were similar in forced expiratory volume in 1 sec (FEV_1), maximal expiratory flow at 50 and 25 percent of vital capacity, slope of phase III of the single-breath nitrogen test ($\Delta N_2/L$), and closing volume (CV/VC percent). Bronchial reactivity was determined as (1) PC_{20} (provocation concentration reducing FEV_1 by 20 percent); (2) threshold concentration reducing FEV_1 by two standard deviations; and (3) percentage reduction in FEV_1 with histamine 16 mg/mL. Similar numbers of smokers and nonsmokers had a PC_{20} below 16, 32, and 64 mg/mL. Threshold concentrations were the same in smokers and nonsmokers, as was reduction in FEV_1 with 16 mg/mL histamine. The bronchoconstrictor response to histamine was significantly related to baseline measurements of expiratory flow (particularly in nonsmokers), but not to $\Delta N_2/L$ or CV/VC percent. Bronchial reactivity to histamine is not increased in young male smokers with normal lung function. The abnormal reactivity seen in older smokers is acquired, either from prolonged exposure to cigarette smoke itself or from resultant airway narrowing. (Auth. Abs.)

86–0129. Trell, L., Janzon, L.; Korsgaard, R., et al. **Smoking, Carboxyhaemoglobin, Carbon Monoxide in Expired Air and Aryl Hydrocarbon Hydroxylase Inducibility. A Cross-Sectional Study and Anti-Smoking Applications in Middle-Aged Men.** *Anticancer Research* 4:347-349, 1984.

To determine interrelationships and possible antismoking usefulness, blood carboxyhemoglobin levels (COHb percent), expired carbon monoxide levels (CO), and aryl hydrocarbon hydroxylase (AHH) inducibility were measured in a sample of males attending a preventive medical screening program in Malmo, Sweden. Frequencies of high, intermediate, and low AHH inducers were the same in all age and smoking habit categories; 7.5 to 10 percent, 42.5 to 47.5 percent, and 42 to 50 percent, respectively. For CO and COHb percent, large differences were observed between the smokers and nonsmokers, but interindividual variations were also found. No correlations were seen between AHH inducibility and CO or COHb percent in any of the smoking categories, suggesting that AHH inducibility is under genetic control and that CO and COHb percent are indicative of inhalation patterns. Because the excessive values for CO, COHb percent, and AHH inducibility are possible indicators of high risk, smokers have been invited to attend information and counseling sessions for smoking cessation. To date, attendance has been very good and preliminary results are encouraging.

86–0130. Vastag, E.; Matthys, H.; Witt, J., et al. **Theophylline Therapy in Chronic Airflow Obstruction.** In: *New Perspectives in Theophylline Therapy*, Royal Society of Medicine International Congress and Symposium Series, No. 78. London, Royal Society of Medicine, 1984, pp. 165-174.

Correlation between the level of serum theophylline and effectiveness of orally administered theophylline-ethylenediamine on mucociliary clearance (MC) and on bronchial obstruction was investigated in seven normal subjects, seven smokers, and seven patients with bronchial carcinoma. ^{99m}Tc-labeled erythrocyte tracers determined MC; maximum expiratory flow volume curves were used to measure respiratory tract obstruction; and concentrations of theophylline in serum were determined by homogeneous enzyme immunoassay. The stimulating effect of theophylline-ethylenediamine on the peripheral areas of the lungs (P-MC) was similar to or greater than that in the central areas (C-MC). Statistically significant differences in C-MC ($p<0.05$) and P-MC ($p<0.001$) were found 60 minutes after the start of measurement in smokers following administration of theophylline-ethylenediamine. Total MC also rose after administration of 12.4±4.2 mg/kg body weight/day in smokers. Serum theophylline concentrations (8 to 16 μg/mL) increased MC about 10 to 20 percent in all cases. Below this range, weaker action or no action was found. Effectiveness correlated with serum theophylline level ($r=0.741$; $p<0.001$). Data indicate that theophylline-ethylenediamine is particularly helpful in improving airway clearance. It is recommended that serum theophylline levels be monitored to achieve optimum therapeutic action and to avoid side effects.

86–0131. Williams, B.T.; Nicholl, J.P. **Prevalence of Hypoxaemic Chronic Obstructive Lung Disease With Reference to Long-Term Oxygen Therapy.** *Lancet* 2(8451):369-372, August 17, 1985.

Eliminating smoking among the majority of hypoxemic patients with airways obstruction may prove to be a cheaper and equally effective alternative to oxygen therapy. A survey was conducted in Sheffield, England, to estimate the prevalence of hypoxemic chronic obstructive lung disease and hence the level of eligibility for long-term oxygen therapy. Of the 3,193 (84 percent) persons completing the MRC Questionnaire on Respiratory Symptoms, 36 percent were current smokers, and 99 of the 221 subjects with the severest degree of airways obstruction (forced expiratory volume in 1 sec ≤ 49 percent) were current smokers. Overall, an estimated 0.3 percent of those aged 45 years or more had hypoxemic chronic obstructive lung disease, defined as intra-arterial oxygen pressures ≤ 7.3 kPa and forced expiratory volumes <50 percent of predicted values. An estimated 603 subjects were eligible for long-term oxygen therapy; however, the majority were current smokers and one-quarter were receiving no medication. It is suggested that the beneficial effect of oxygen therapy may be due to the smoking reduction it necessitates.

86–0132. Witten, M.L.; Lemen, R.J.; Quan, S.F., et al. **Acute Cigarette Smoke Exposure Increases Alveolar Permeability in Rabbits.** *American Review of Respiratory Disease* 132(2):321-325, August 1985.

Results show that acute cigarette smoke exposure increases alveolar permeability as measured by diethylenetriamine pentaacetic acid (DTPA) clearance, but does not induce detectable ultrastructural alterations in the alveolar—capillary membrane. Lung clearance of aerosolized technetium-labeled (^{99M}Tc)DTPA, an index of alveolar epithelial permeability, was determined in cigarette smoke-exposed rabbits. Eighteen rabbits were randomly assigned to three groups: control, all smoke exposure (ASE), and limited smoke exposure (LSE). Cigarette or sham smoke was delivered by syringe in a series of 5, 10, 20, and 30 tidal volume breaths with a 20-minute counting period between each subset of breaths to determine ^{99M}TcDTPA biologic half-life (T1/2). The smallest T1/2 observed was significantly lower ($p<0.05$) for ASE and LSE rabbits than for controls. A significant difference was observed at 20 and 30 breath exposures between control and ASE group mean values (percent baseline) for T1/2, arterial blood pressure, and peak airway pressure. A combination of light and electron microscopy revealed focal alveolar edema and hemorrhage in the ASE and LSE groups but no alveolar—capillary membrane damage. (Auth. Abs. Mod.)

CARDIOVASCULAR DISEASES

86–0133. Aberg, H.; Lithell, H.; Selinus, I., et al. **Serum Triglycerides Are a Risk Factor for Myocardial Infarction But Not for Angina Pectoris. Results From a 10-Year Follow-Up of Uppsala Primary Preventive Study.** *Atherosclerosis* 54(1):89-97, January 1985.

A prospective study of 2,291 men born between 1920 and 1924 in Uppsala, Sweden, identified smoking, hypertension, serum cholesterol, and serum triglycerides as risk factors for both fatal and nonfatal myocardial infarction (MI). Questionnaire responses showed that 58 men (63.8 percent smokers) had had a verifiable MI, 28 (55 percent smokers) had angina pectoris, and 20 (42.9 percent smokers) had experienced chest pain from other causes. Risk factor patterns were similar in the MI and angina groups, except that triglyceride levels were normal in angina pectoris patients. Smoking habits did not differ between the men who had a fatal MI and those who had had a nonfatal MI, although the fatal MI cases had higher blood pressures. Anomalies between the questionnaire data and hospital records regarding specific diagnoses and their implications for epidemiological research are discussed.

86–0134. Cooper, C.L.; Faragher, E.B.; Bray, C.L., et al. **The Significance of Psychosocial Factors in Predicting Coronary Disease in Patients With Valvular Heart Disease.** *Social Science and Medicine* 20(4):315-318, 1985.

In addition to a family history of ischemic heart disease and Type A behavior, the number of cigarettes smoked in life increased the likelihood of a subject having a history of hypertension. Inclusion of psychosocial factors significantly improved indices for predicting various aspects of coronary artery disease among 218 patients (100 males and 118 females) with valvular heart disease who had undergone routine coronary arteriography before valve replacement. Factors studied included number of cigarettes smoked, family history of ischemic heart disease, ratio of high density lipoprotein to cholesterol, angina, sex, blood pressure, and four psychosocial characteristics: social support, work stress, life events, and Type A behavior. The likelihood of signs of peripheral vascular disease, mitral valve disease, angina, and coronary artery disease were also related to total number of cigarettes smoked in life. Type A behavior was significantly implicated in improving the predictive power of earlier found correlates (including smoking) of signs of peripheral vascular disease. It is suggested that Type A behavior may encourage more smoking and greater fatty intake in the diet. It was also found that lack of social support and adverse life events are significant predictors of electrocardiographic evidence of myocardial infarction. The psychosocial factors improved preoperative predictive power of significant coronary artery disease in four criteria: previous history of hypertension, previous history of myocardial infarction, signs of peripheral vascular disease, and ECG evidence of myocardial infarction. (Auth. Abs. Mod.)

86–0135. Cruickshank, J.M. **MRC Trial of Treatment of Mild Hypertension. (Letter).** *British Medical Journal* 291(6490):277-278, July 1985.

Cigarette smoking proved to be a major confounding factor in the Medical Research Council's study on whether the rate of coronary events and strokes among middle-aged men and women with mild hypertension could be reduced by drug treatment. Frequency of coronary events (more than five times as common in men than in women) and of strokes was about doubled in smokers. Diuretics did not modify coronary event rate in either smokers or nonsmokers, whereas propranolol diminished the rate by one-third in nonsmoking men, indicating that blood pressure control with propranolol was less effective in smokers. In an investigation of the hypertensive response to smoking (and coffee drinking), nonselective oxprenolol and propranolol did not attenuate the hypertensive response, but atenolol did. In patients with ischemic heart disease, smoking not only increases heart rate and systolic blood pressure but also diminishes oxygen delivery to myocardium by decreasing coronary blood flow and increasing carboxyhemoglobin concentration. Smoking significantly diminished antianginal effects of propranolol and, by inducing hepatic enzymes, resulted in lower plasma concentrations of propranolol but not of nonmetabolized atenolol. Adverse drug interaction in smokers with angina was less apparent with cardioselective atenolol than with propranolol.

86–0136. Diamantopoulos, E.J.; Raptis, S.; Christodoulou, M.N., et al. **Impaired Red Blood Cell Deformability in Diabetic Angiopathy.** In: *Diabetes Mellitus. Achievements and Scepticism.* Royal Society of Medicine International Congress and Symposium Series No. 77. London, Royal Society of Medicine, 1984, pp. 93-104.

Red blood cell deformability in normal and in diabetic subjects with and without vascular complications was investigated to study its relationship to retinopathy, coronary arteriopathy, and peripheral occlusive arteriopathy. The possible influence of number of cigarettes smoked/day, age, duration of disease, blood glucose, and body mass index on rigidity of red blood cells among diabetics was explored. Diabetics (42 males and 22 females) aged 38 to 78 years (mean age 58 years) were studied. When patients were compared with 40 healthy controls, no statistically significant differences were found for age, body mass index, systolic and diastolic blood pressures, and number of cigarettes smoked/day. The percentage of smokers did not differ significantly between diabetics and controls. In general, diabetics with high ankle systolic blood pressure indices presented a higher red blood cell deformability, except for those suffering from coronary heart disease or retinopathy.

86–0137. Doscher, W.; Viswanathan, B.; Stein, T., et al. **Physiologic Anatomy of the Palmar Circulation in 200 Normal Hands.** *Journal of Cardiovascular Surgery* 26(2):171-174, March-April 1985.

Tobacco use did not increase incidence of incomplete Superficial Palmar Arch (SPA) in 100 asymptomatic volunteers (200 normal hands). Functional capacity of SPA was evaluated by a noninvasive narrow beam ultrasonic technique. Peak systolic velocity of flow with radial artery occlusion increased in all but 22 SPAs (11 percent), which were considered incomplete. Ulnar artery occlusion resulted in more variable response, including 89 (45 percent) SPAs with bidirectional flow. SPA blood flow is complex, but understandable in terms of hand blood flow and vascular bed resistance. (Auth. Abs. Mod.)

86–0138. Erb, R.J.; Plachetka, J.R. **Thermographic Evaluation of the Peripheral Vascular Effects of Labetalol and Propranolol.** *Current Therapeutic Research* 38(1):68-73, July 1985.

An evaluation of the hemodynamic and peripheral vascular effects of labetalol (300 mg) and propranolol (80 mg) showed that even after smoking, hand temperature was warmer with labetalol. The drugs were tested in six subjects using a randomized, double-blind, crossover design. Labetalol significantly lowered mean arterial blood pressure and increased hand temperature, but had no effect on heart rate. Propranolol significantly reduced heart rate, but had no effect on hand temperature or mean arterial blood pressure. Digital plethysmography showed no significant changes with either agent. Smoking one cigarette resulted in lower hand temperatures in all subjects, paralleling smoking-induced increases in heart rate and blood pressure. The effects of smoking persisted for 1 hour, and although the differences between the two drugs were maintained during smoking, neither influenced the effects of smoking. (Auth. Abs. Mod.)

86–0139. Farquhar, J.W.; Fortmann, S.P.; Maccoby, N., et al. **The Stanford Five-City Project: Design and Methods.** *American Journal of Epidemiology* 122(2):323-334, August 1985.

The purposes, hypotheses, design, and method of the Stanford Five-City Project, a large experimental field study of community health education for prevention of cardiovascular disease, are defined as a reference for future papers describing results. The project was designed to provide data on fundamental questions in cardiovascular disease epidemiology, communication, health education, behavior change, and community organization and to test the potentially cost-effective program for prevention of cardiovascular disease at the community level. It is hypothesized that a 20 percent decrease in cardiovascular disease risk will lead to a significant decline in cardiovascular disease event rates in two treatment communities compared with three reference communities as a result of a 6-year intervention program. Risk factor change will be assessed through four surveys of independent samples and in a repeatedly surveyed cohort. Cardiovascular disease event rates will be assessed through continuous community surveillance of fatal and nonfatal myocardial infarction and stroke. (Auth. Abs. Mod.)

86–0140. Fekete, T.; Mosler, R.; Panduru, V. **Vascular Risk Factors in the Obliterative Peripheral Arteriopathy of Diabetic Patients.** *Medecine Interne* 23(1):23-28, January-March 1985.

The role of smoking and other vascular risk factors in obliterative peripheral arteriopathy (PA) in diabetics was investigated in 20 diabetics without PA, 30 diabetics with PA, and 21 nondiabetics with PA. Age, sex, body weight, blood pressure, sedentary lifestyle, diabetes therapy, plasma glucose, cholesterol, triglycerides, total lipids, high density lipoprotein cholesterol, uric acid, and fibrinogen were also assessed. Results show that the risk factors maintain their role even in the obliterative peripheral arteriopathy of diabetic patients; however, there are differences in the relative importance of some of the factors. Age was the most important factor, followed by sex, obesity, arterial hypertension, smoking, and sedentary life style. The role of smoking was less important in diabetics with PA than in diabetics without PA, which may be because in the group of diabetics with PA there were significantly more women that were nonsmokers. (Auth. Abs. Mod.)

86–0141. Finnegan, D.L.; Suler, J.R. **Psychological Factors Associated With Maintenance of Improved Health Behaviors in Postcoronary Patients.** *Journal of Psychology* 119(1):87-94, January 1985.

The belief that improvements in behavior could prevent further heart problems was related only to maintenance of smoking reduction ($p<0.05$) among 35 postcoronary disease patients. Interviews with patients indicated that psychological reactions to success or failure of one health behavior change, especially smoking, may affect the ability to maintain changes in other health behaviors. Smoking, a diet high in saturated fat and cholesterol, excess weight, and sedentary living are behavior patterns most frequently identified as risk factors for coronary heart disease. Intervention programs usually focus on smoking cessation, dietary modification, and increased physical activity to lower incidence of the disease. The two major psychological factors that impact on postcoronary maintenance of improved health behaviors are (1) the beneficial psychological effects resulting from the act of adhering to a health behavior change, a secondary psychological reaction that in turn facilitates change and maintenance of change in other health behaviors; and (2) the psychological sequelae that develop in response to having had a heart attack that subsequently disrupt the patient's attempts to change health habits. Significant differences in the desire for social support emerged between patients who were successful in maintaining smoking cessation and those who were not. Those unable to quit showed a significantly greater need for help and support; successful quitters often stated that they did not want and did not need help, which may reflect personality differences that affect success. (Auth. Abs. Mod.)

86–0142. Friedlander, Y.; Kark, J.D.; Stein, Y. **Family History of Myocardial Infarction as an Independent Risk Factor for Coronary Heart Disease.** *British Heart Journal* 53(4):382-387, April 1985.

Smoking was found to be inversely, but not significantly, related to coronary heart disease (CHD) among 123 patients with CHD and 921 controls enrolled in a risk factor surveillance survey. Among patients and controls, 31 and 40 percent, respectively, were current smokers and 29 and 24 percent, respectively, were ex-smokers. Logistic modeling for CHD yielded regression coefficients for smoking of -0.399 (odds ratio = 0.67) in univariate analysis and -0.410 (odds ratio = 0.66) in multivariate analysis. Results may be partially attributable to experimental bias; the proportion of current smokers among CHD patients was lower (31 percent) than among the controls (40 percent). The overall objective was to evaluate the association of a history of heart attack before the age of 60 years in first degree relatives with the prevalence of CHD in study participants. A family history of heart attack showed a significantly positive association in 29 percent of CHD patients and 19 percent of controls reporting this relationship. Patients also had considerably higher concentrations of total cholesterol, higher blood pressures, and lower concentrations of high density lipoprotein cholesterol than controls.

86–0143. Goldbourt, U.; Neufeld, H.N. **Trends in Coronary Heart Disease Mortality and Related Factors in Israel.** *Cardiology* 72(1/2):63-74, 1985.

Age-adjusted mortality from coronary heart disease (CHD) declined between 1974 and 1979 among Jews living in Israel, despite few changes in cigarette smoking habits or serum cholesterol levels. The overall death rate also declined during this period. One multiple intervention trial achieved an 11 percent reduction in smoking and similar reductions in prevalence of hypertension, obesity, and hypercholesterolemia. However, the changes did not significantly influence mortality in the intervention community. Although a recent law prohibiting smoking in public places could affect future smoking rates, a reduction in smoking is not yet evident. The reduction in CHD was associated with the introduction of coronary care units, coronary bypass surgery, improved emergency service, and cardiopulmonary resuscitation procedures. The modernization of diagnostic procedures, discharge and rehabilitation, and possibly pharmacologic therapy may also have contributed to the decline. The evidence for improved screening, treatment, and control of hypertension is suggestive but not conclusive. Also, the changes in CHD mortality were not accompanied by putatively antiatherogenic trends in eating habits. Although the reasons behind the striking decline in CHD mortality are not clear, there is little available data that suggest a meaningful effect of life-style modifications on mortality trends. (Auth. Abs. Mod.)

86–0144. Guillon, J.M. **Les Troubles Hematologiques du Tabagisme. [Hematologic Disorders in Smokers.]** *Semaine des Hopitaux* 61(23):1693-1699, May 1985, French.

Various hematologic disorders are found in smokers, including polycythemia (either absolute or relative), which is common in heavy smokers and produces few or no symptoms. A high leukocyte count is well correlated with heavy smoking, but there is no evidence to connect it with smoking-related diseases. Functional abnormalities of polymorphonuclear leukocytes are of more concern because they contribute to increased susceptibility to infections in heavy smokers. Sustained smoking impairs cell-mediated defense mechanisms in the respiratory tract and modifies concentrations of various immunoglobulins. The findings provide new insight into the effects of smoking. Influence of smoking on blood clotting, especially on platelet activity, most probably contributes to high incidence of atheromatosis in smokers. The hematologist has good reasons for advising against smoking or at least from inhaling smoke. (Auth. Abs. Mod.)

86–0145. Hardes, G.R.; Dobson, A.J.; Lloyd, D.M., et al. **Coronary Heart Disease Mortality Trends and Related Factors in Australia.** *Cardiology* 72(1/2):23-28, 1985.

Decreases in smoking, reductions in tar content of cigarettes, and other lifestyle changes among Australians are being credited for the lowest mortality from coronary heart disease (CHD) in 30 years. In 1965 to 1967, CHD mortality peaked for most age and sex groups and was the greatest single cause of death in Australia. Since that time, rates have decreased by nearly 40 percent. CHD mortality rates are highest in the eastern areas of Australia, among those who were born in Australia, and among lower socioeconomic groups. In addition to lifestyle changes, changes in CHD mortality have been accompanied by changes in treatment (especially in control of hypertension and surgical interventions). Concurrent studies of the incidence and case fatality rates in two population centers (Perth and Newcastle) coupled with periodic surveys of changes in treatment and population risk factor levels over a 10-year period are being undertaken to understand current and future trends in CHD mortality. (Auth. Abs. Mod.)

86–0146. Kornitzer, M. **Evolution of Coronary Heart Disease Mortality From 1958 in Belgium.** *Cardiology* 72(1/2):59-62, 1985.

While cigarette consumption and coronary heart disease (CHD) mortality showed parallel declines during the late 1960s and 1970s, treatment of symptomatic CHD underwent dramatic changes and probably had an influence on the lethality of the disease. Between 1958 and 1968, CHD mortality among 40-year-old males increased 5 percent annually. Between 1969 and 1977, there was an 8.8 percent decline in all-age mortality (1 percent annually); however, the decrease among males 45 to 49 years of age was 22.3 percent compared with 4.7 percent among males aged 60 to 64 and 19 percent among males aged 25 to 64. Among females, all-age mortality decreased 5.1 percent over 9 years (32.6 percent among females aged 25 to 64). Consumption of saturated fats and salt decreased and soft margarine consumption increased markedly during the 1970s. The first beta blocker and coronary care unit were introduced in Belgium at the beginning of the 1960s; since the first coronary bypass operation in 1970, 10,000 operations have been conducted (up to the end of 1983). Coronary risk factors and incidence of myocardial infarction and CHD mortality over a 10-year period are currently being monitored in two Belgium cities to more thoroughly isolate influencing factors in CHD mortality. (Auth. Abs. Mod.)

86–0147. Kottke, T.E. **Risk Factor Control in Coronary Heart Disease. Who Needs It?** *Postgraduate Medicine* 78(1):233-237, 240-241, 244-245, July 1985.

The strategy for preventing coronary heart disease (CHD) presented provides guidelines for physicians to help modify patients' smoking habits, diet, and blood pressure. Cigarette use, high blood pressure, and elevated serum cholesterol levels act synergistically to increase CHD risk. Primary care physicians are advised to ask patients to stop smoking, have the patient analyze his/her smoking pattern, obtain a commitment to quit, prepare a written cessation contract, schedule followup appointments after the quit date, positively reinforce all attempts to quit, and remember that most people will relapse several times before finally succeeding. Physicians are also reminded that stopping smoking requires the development of skills, and that previous failures are predictors of success. It is further emphasized that more CHD can be prevented by modest changes in all patients than by large changes in select high-risk patients. Also explored are the management of hypertension, changes in diet, the relationship between behavior and risk, the nature of behavior change, and the feasibility of changing CHD rates.

86–0148. Kromhout, D.; Wibowo, A.A.E.; Herber, R.F.M., et al. **Trace Metals and Coronary Heart Disease Risk Indicators in 152 Elderly Men (The Zutphen Study).** *American Journal of Epidemiology* 122(3):378-385, September 1985.

Serum copper and blood cadmium levels were positively related to cigarette smoking among a subgroup of 152 men aged 57 to 76 years who participated in the Zutphen Study. Information concerning serum levels of lithium, copper, and zinc, and blood levels of cadmium and lead was obtained and compared with the following coronary heart disease risk indicators: total and high density lipoprotein cholesterol, systolic and diastolic blood pressure, smoking habits, and Quetelet index. The survey found that 53 of the men were nonsmokers, 58 smoked <10 cigarettes/day, and 40 smoked ≥ 10 cigarettes/day. Analysis showed that serum zinc was inversely related to resting heart rate; serum copper was also inversely related to high density lipoprotein cholesterol; and blood cadmium was inversely related to Quetelet index. The positive relationship found between blood lead and cigarette smoking was of borderline significance. Blood lead was related to blood pressure, with the relation being stronger for systolic than for diastolic pressure. (Auth. Abs. Mod.)

86–0149. Lindquist, O.; Bengtsson, C.; Lapidus, L. **Relationships Between the Menopause and Risk Factors for Ischaemic Heart Disease.** *Acta Obstetricia et Gynecologica Scandinavica* Supplement 130:43-47, 1985.

Data on smoking habits, arterial blood pressure, body weight, and serum cholesterol and triglycerides were obtained in a cross-sectional and longitudinal population study of pre- and postmenopausal women in Gothenburg, Sweden, to determine if the association between menopausal age and ischemic heart disease is indirectly due to these factors. Of 161 postmenopausal 50-year-old women, 80 were smokers compared with 43 of 168 premenopausal 50-year-olds ($p<0.001$). Generally, postmenopausal smokers had smoked as long as or longer than premenopausal smokers; therefore, the large number of postmenopausal smokers was not due to smoking initiation in connection with menopause. Results indicate that early menopause in smokers was secondary to smoking habits. Serum cholesterol and triglyceride levels were higher in postmenopausal women than in premenopausal women, but the reverse was found for systolic blood pressure and body weight. (Nonsmokers were generally heavier than smokers.) It is conceivable that these changes were secondary to a changed menopausal state. The most marked differences in connection with change in menopausal state were found for serum cholesterol and triglycerides, which moved in a direction considered to be detrimental. Influence on body weight and blood pressure appeared to be beneficial.

86–0150. Lynch, P.; Ineson, N.; Jones, K.P., et al. **Risk Profile of Soldiers Aged Under 40 With Coronary Heart Disease.** *British Medical Journal* 290(6485):1868-1869, June 1985.

Smoking is a risk factor for coronary heart disease (CHD) in the junior ranks of the British army, in which the mortality rate is higher than in comparable civilians. High serum cholesterol concentration and high relative body weight were also identified as risk factors in 45 young soldiers. The men (mean age 34.5 years), who had survived a coronary event, took part in a cardiac rehabilitation program between 1979 and 1983. All patients had a minimum of 70 percent stenosis of at least one coronary artery and 13 were obese; 42 (95 percent) were smokers with average consumption of 28 cigarettes/day (18 smoked >30 cigarettes/day and 11 smoked >40 cigarettes/day). Mean serum total cholesterol concentration was 6.83 mmol/L (264 mg/100 mL), with 10 patients having concentrations in excess of 8 mmol/L (309 mg/100 mL). None had blood pressure consistently $>140/90$ mm Hg, except one patient being treated for hypertension. A family history of coronary heart disease was obtained in 22 cases. Low prevalence of hypertension and glucose intolerance may reflect the fact that these two risk factors, and possibly gross obesity, preclude recruitment. High cholesterol concentrations may be the result of bias induced by familial hypercholesterolemia. The high CHD mortality seems to be the result of heavy cigarette smoking; the expected protective effect of physical fitness is overwhelmed by the effect of high consumption.

86–0151. Medical Research Council Working Party. **MRC Trial of Treatment of Mild Hypertension: Principal Results.** *British Medical Journal* 291(6488):97-104, July 13, 1985.

The Medical Research Council's trial of drug treatment for mild hypertension showed that for all categories of cardiovascular events, in both treated and placebo groups, incidence rates were lower in nonsmokers than in smokers, adding to previous evidence that smoking increases the risk of cardiovascular disease. In the single-blind study, 17,354 patients were randomly allocated to treatment with bendrofluazide, propranolol, or placebo tablets. Incidence of stroke was reduced in both smokers and nonsmokers taking bendrofluazide, but only in nonsmokers taking propranolol ($p=0.03$). Bendrofluazide did not reduce the coronary event rate, regardless of smoking status. Propranolol reduced the coronary event rate in nonsmokers, but not in smokers. Cardiovascular events were not reduced by bendrofluazide, regardless of smoking status, or in smokers taking propranolol; however, events were reduced in nonsmokers taking propranolol. For stroke and for all cardiovascular events the difference between rates in smokers and nonsmokers was greater than the effect of drug treatment. Active drug treatment was associated with a small reduction in stroke rate; however, a substantial percentage of patients had chronic side effects. Treatment did not appear to save lives or substantially alter the overall risk of coronary heart disease.

86–0152. Mulcahy, R.; Al Awadhi, A.H.; De Buitleor, M., et al. **Natural History and Prognosis of Unstable Angina.** *American Heart Journal* 109(4):753-758, April 1985.

Never smoking was associated with a significantly higher incidence of persistence of pain following hospitalization in 100 unstable angina patients not receiving routine intensive medical therapy. Of the 20 nonsmokers, 75 percent had pain for more than 24 hours compared with 29.7 percent of 37 ex-smokers and 37.2 percent of 43 current smokers ($p<0.01$). Persistence of pain and the magnitude and extent of electrocardiogram ST-T changes were the only predictors of an unfavorable outcome. One death and nine nonfatal infarctions occurred within the first 28 days. During 1-year followup, 8 deaths, 14 nonfatal infarctions, and 3 readmissions occurred. It is suggested that the mechanism of ischemia may differ in smoking and nonsmoking groups, with perhaps a higher frequency of spasms in current and ex-smokers. Smokers who suffer a myocardial infarction may have less diffuse coronary atherosclerosis and more localized thrombotic obstructive lesions than nonsmokers. Also, cessation of smoking in the coronary care unit may lead to a reduction of platelet activity with a corresponding subsidence of pain.

86–0153. Okumiya, N.; Tanaka, K.; Ueda, K., et al. **Coronary Atherosclerosis and Antecedent Risk Factors: Pathologic and Epidemiologic Study in Hisayama, Japan.** *American Journal of Cardiology* 56(1):62-66, July 1985.

A pathologic and epidemiologic autopsy study of coronary atherosclerosis performed on 281 subjects aged 40 years and older indicated a positive correlation with antecedent elevated blood pressure and higher serum total cholesterol levels. Cigarette smoking, one of seven selected factors observed (including age, gender, mean arterial blood pressure, serum total cholesterol, body mass index, and alcohol intake), also showed a positive correlation, but the association was weak and insignificant. The study, which took place between 1971 and 1981 in Hisayama, Kyushu Island, Japan, was initiated in 1961 to determine the epidemiologic trends of cardiovascular disease in a general population. Grading of coronary atherosclerosis was made by degree of luminal stenosis. Severity of coronary atherosclerosis revealed age-related progression. In multivariate analysis, factors that significantly ($p<0.05$) and positively correlated with coronary atherosclerosis were age, mean arterial blood pressure, serum total cholesterol, gender, and body mass index. Overall contribution of the seven selected factors to coronary atherosclerosis was nearly 33.5 percent of total variation. (Auth. Abs. Mod.)

86–0154. Pyorala, K.; Salonen, J.T.; Valkonen, T. **Trends in Coronary Heart Disease Mortality and Morbidity and Related Factors in Finland.** *Cardiology* 72(1/2):35-51, 1985.

The recent decline in coronary heart disease (CHD) mortality in Finland is attributed to reductions in cigarette smoking and other lifestyle factors. From 1957 through the mid-1960s, cardiovascular mortality increased 29 percent and CHD mortality increased 40 percent. However, during the last half of the 1960s, CHD mortality leveled off and began to decline rapidly, dropping an average of 1.8 percent annually between 1969 and 1981 in males aged 34 to 64. Data also show that between 1970 and 1977, annual incidence of myocardial infarction dropped 8 percent in men aged 20 to 64 years. Correspondingly, smoking rates for men peaked at about 60 percent in the early 1960s and then declined. In 1983, less than 35 percent were smokers. The decline was particularly marked in North Karelia, as a result of the North Karelia Intervention Project. Among women, less than 15 percent smoked in the early 1960s, but smoking prevalence increased to over 20 percent in the early 1970s, and then decreased to just over 15 percent. Concurrent changes in diet, serum cholesterol levels, blood pressure, obesity, and physical activity, and the management of symptomatic CHD are also discussed.

86–0155. Shaper, A.G. **Geographic Variations in Cardiovascular Mortality in Great Britain.** *British Medical Bulletin* 40(4):366-373, October 1984.

Smoking and hypertension are the major determining factors in the regional variations in ischemic heart disease mortality in Great Britain. The Regional Heart Study showed that regional variations in ischemic heart disease mortality are reflected in similar variations in the prevalence of ischemic heart disease. Variations in mean blood pressure levels and in prevalence of heavy cigarette smoking in British towns are closely associated with town variations in ischemic heart disease prevalence and mortality. Other factors, including blood lipid concentrations, probably play a more fundamental role in the development of atherosclerosis and its complications, but in a country with a high level of cardiovascular disease (such as Great Britain) they do not appear to be responsible for regional variations in cardiovascular mortality. Water hardness, temperature, and rainfall also play a role in determining cardiovascular mortality. The magnitude of their effects, however, seems to be relatively small compared with the effects of other risk factors such as cigarette smoking and blood pressure. At present, recommendations to harden very soft water cannot be justified on the basis of possible effects on cardiovascular disease. (Auth. Abs. Mod.)

86–0156. Stamler, J. **The Marked Decline in Coronary Heart Disease Mortality Rates in the United States, 1968-1981; Summary of Findings and Possible Explanations.** *Cardiology* 72(1/2):11-22, 1985.

Reductions in smoking, changes in eating habits, and improvements in medical/surgical care are credited with the decline in coronary heart disease (CHD) mortality in the United States, which is greater than in any other country. CHD mortality among persons aged 35 to 74 decreased 3 percent annually between 1968 and 1981 (year of last record), after increasing 14.1 percent/year from 1940 to 1967. The trend is apparent for both myocardial infarction (MI) and chronic ischemic heart disease, but is more prominent for MI, especially among adults aged 35 to 64. Mortality rates from stroke have decreased since 1968 (reducing mortality from major cardiovascular diseases). It is noted that since the 1964 Surgeon General's Report, progressive decreases in cigarette use have been recorded: from 51 percent in 1965 to 36 percent in 1980 among men, and from 33 percent to 29 percent among women. Also, changes in cigarette manufacture (filters and expansion techniques that reduce total tobacco/cigarette and total smoke exposure) contributed to a decrease in consumption among those who continued to smoke. As with eating habits, smoking became associated with social class; the higher educational/occupational categories had the lowest number of smokers. Changes in control of hypertension, consumption of saturated fats, leisure time activity, and control of hypercholesterolemia are also discussed.

86–0157. Steyn, K.; Jooste, P.L.; Langenhoven, M.L., et al. **Coronary Risk Factors in the Coloured Population of the Cape Peninsula.** *South African Medical Journal* 67(16):619-625, April 1985.

Analysis of a random sample of 976 black South Africans showed that they are at high risk of coronary heart disease (CHD). Major reversible risk factors were very common; 56 percent of men and 40 percent of women were smokers, and most smoked heavily. Cigarette consumption increased with age in men. In women, those aged 35 to 44 were the heaviest consumers. By age 24, over 40 percent of men and 25 percent of women were consuming enough cigarettes/day to place them at highly significant risk of CHD. Cigarette use was the largest contributor to CHD risk in the younger age groups. Besides smoking, 18 percent of both men and women were hypertensive and 17 percent of both sexes were hypercholesterolemic. Other risk factors, such as inactivity, obesity, hyperuricemia, hypertriglyceridemia, and positive family history of CHD were also common. At high cut-off points, 62.8 percent of men and 59.4 percent of women had at least one major reversible risk factor. Although a "protective" high-density lipoprotein cholesterol level of ≥ 20 percent of total serum cholesterol was found in 74.5 percent of men and 81.1 percent of women, it is suggested that preventive strategies are needed. (Auth. Abs. Mod.)

86–0158. Superko, H.R.; Wood, P.D.; Haskell, W.L. **Coronary Heart Disease and Risk Factor Modification. Is There a Threshold?** *American Journal of Medicine* 78:826-838, May 1985.

Epidemiologic studies and arteriographic investigations have examined the threshold levels of behavioral risk factor modification that may be required to obtain some benefit. The degree of modification needed to significantly reduce coronary heart disease (CHD) is controversial, but it is concluded that cigarette use must be discontinued entirely. Periodic abstainers have risk levels between the levels of continuing smokers and those of ex-smokers. The progression rate of coronary atherosclerosis is twice as high in continuing smokers as in quitters who are completely abstinent. Other suggested CHD risk factor modifications to achieve optimal health goals include (1) modifying risks as early as possible; (2) increasing physical activity (2,000 to 3,000 kcal/week); (3) having a total plasma cholesterol ranging from 150 to 180 mg/dL and/or total cholesterol/high-density lipoprotein ratio of < 3.5; (4) reducing blood pressure to $< 140/90$ mm Hg; (5) controlling fasting level of serum triglycerides at < 120 mg/dL (through diet, exercise, and weight management); (6) normalizing glucose tolerance; (7) adopting a low-fat, high-fiber diet (20 to 30 percent dietary calories as fat, 50 percent as complex carbohydrates, polyunsaturated/saturated > 1.0, daily cholesterol < 250 mg); and (8) achieving and maintaining appropriate body fat (< 15 percent for males and < 20 percent for females). (Auth. Abs. Mod.)

86–0159. Tango, M; Krogsgaard, A.R.; Trap-Jensen, J., et al. **Haemodynamic Effects of Cigarette Smoking Before and During Long-Term Non-Selective and Selective Beta-Adrenergic Blockade in Patients with Arterial Hypertension.** *Acta Medica Scandinavica* 693(Supplement):111-114, 1985.

Hemodynamic effects of cigarette smoking during long-term beta blockade in a group of hypertensive patients indicated that smoking increases heart rate, blood pressure, and adrenaline level in blood. During acute beta-blockage, blood pressure response to cigarette smoking and to adrenaline infusion differs between nonselective and beta-1-selective beta adrenergic blockage. During blockage with nonselective propranolol, a marked increase in blood pressure, especially diastolic, was observed in the two experimental situations. After beta-1-selective blockage with atenolol, blood pressure response did not differ from that found after placebo. Studies performed only after acute beta-blockage and in healthy volunteers revealed that hemodynamic effects of acute beta-blockage differ from those seen during long-term oral beta blockade.

86–0160. Thelle, D.S. **Coronary Heart Disease Mortality Trends and Related Factors in Norway.** *Cardiology* 72(1/2):52-58, 1985.

Coronary heart disease (CHD) mortality rates among Norwegian men aged 35 to 44 years decreased 25 percent between 1966 and 1970 and 1976 and 1980, probably as a result of health-related behavioral changes, specifically in smoking habits and diet. However, only a modest decline was observed in older age groups. Changes in health-related behavior began in the 1960s, when 44 percent of Norwegians switched to low-fat diets following a period before and after the Second World War, when meat, sugar, and total fat consumption increased and consumption of cereals decreased. A recent survey indicates that the number of nonsmokers has been increasing, particularly since 1975-1976. Leisure time physical activity also increased after the mid-1970s, but mostly among members of higher social strata. It is suggested that the decrease in CHD mortality is a result of a decrease in incidence. Improved medical care of CHD patients did not have a major impact on mortality. (Auth. Abs. Mod.)

86–0161. Theorell, T.; Alfredsson, L.; Knox, S., et al. **On the Interplay Between Socioeconomic Factors, Personality and Work Environment in the Pathogenesis of Cardiovascular Disease.** *Scandinavian Journal of Work and Environmental Health* 10(6, Special):373-380, December 1984.

Cardiovascular risk factors such as cigarette smoking and repeated blood pressure elevations may be influenced by psychosocial factors. Lack of intellectual stimulation at work, particularly if combined with excessive demands, may increase risk of cardiovascular disease. Major findings in research on associations between psychosocial factors and cardiovascular illness are summarized and methodological difficulties are discussed. It is emphasized that an interplay between environmental and individual factors is of great importance. Personality factors relevant to risk of cardiovascular illness may distort individual descriptions of the work environment. (Auth. Abs. Mod.)

86–0162. Tretli, S.; Bjartveit, K.; Foss, O.P., et al. **Intervention on Cardiovascular Disease Risk Factors in Finnmark County: Changes After a Period of Three Years.** *Scandinavian Journal of Social Medicine* 13(1):1-13, 1985.

A personal intervention program among high-risk cardiovascular disease residents of Finnmark resulted in a 20 percent health benefit for the county with the highest cardiovascular mortality rate in Norway. Although the downtrend is attributed mainly to a decrease in total serum cholesterol, cigarette consumption had decreased 12 percent among men and 4 percent among women. Subjects (12,329 persons aged 20 to 49 years) participated in two screening examinations 3 years apart. The primary health service attempted to reduce the risk of cardiovascular disease by means of a personal intervention program among high-risk individuals and a health education program directed at all residents. Over the 3-year period, total serum cholesterol level decreased by about 0.3 mmol/L owing to (1) a decrease among persons who had been recommended for followup examination and (2) a decrease among household members of persons followed up. A recommendation to attend a followup examination because of high blood pressure had doubtful effect. (Auth. Abs. Mod.)

86–0163. Underwood, D.A.; Proudfit, W.L.; Lim, J., et al. **Symptomatic Coronary Artery Disease in Patients Aged 21 to 30 Years.** *American Journal of Cardiology* 55(6):631-634, March 1985.

Young men with coronary artery disease (CAD) had a history of cigarette smoking and higher incidence and prematurity of the disease than similarly aged healthy controls. Prevalence of risk factors was studied in 88 men and 13 women, aged 30 years or younger, with obstructive CAD. Men were compared with arteriographically normal controls, matched for age and date of catheterization. Significant risk factors identified were cigarette smoking ($p=0.001$), familial CAD ($p=0.002$), and familial CAD manifested by age 50 years or younger ($p=0.005$). Serum cholesterol values were significantly higher in the CAD group ($p=0.0001$), but were still <250 mg/dL in 54 percent. Arteriography showed a spectrum of CAD: one vessel disease in 57, two vessel in 21, and three vessel in 22. One patient had significant left main CAD. Followup showed 3 percent mortality at 1 year and 20 percent at 5 years. Causes of death were myocardial infarction in 10 patients, congestive heart failure in 2, and sudden death in 6. Three patients died of noncardiac causes. (Auth. Abs. Mod.)

86–0164. Wallentin L.; Sundin, B. **Aberrations in Lipoprotein Lipids in Men With Coronary Artery Disease and the Influence of Obesity, Smoking and Beta-Adrenoceptor Blocking Drugs.** *Atherosclerosis* 54(3):241-249, March 1985.

Smoking had no significant influence on lipoprotein levels in 74 men, 40 to 60 years old, with incapacitating angina pectoris and angiographically verified coronary artery disease (CAD). The influence of smoking, obesity, socioeconomic conditions, and drug treatment on lipoprotein levels was investigated. Obesity and smoking were more common in patients than in an equal number of randomly sampled healthy men matched for age, occupation, and place of living (controls). Patients had elevated cholesterol (C), triglycerides (TG), and phospholipid (PL) levels (higher concentrations of very low density lipoproteins (VLDL) and low density lipoproteins (LDL)). C and PL levels in the high density lipoprotein (HDL) fraction were decreased. Obesity had a significant influence on VLDL and HDL levels. Patients had higher VLDL and LDL levels and a lower HDL concentrations than controls. Regardless of TG concentration influence, HDL level was reduced in patients. Treatment with beta-adrenoceptor blocking drugs was not associated with any significant alteration of VLDL or HDL levels. Results strengthen the importance of lipoprotein aberrations as risk factors for coronary heart disease in association with obesity, smoking, and treatment with beta-adrenoceptor blocking drugs.

86–0165. Wenger, N.K. **Coronary Disease in Women.** *Annual Review of Medicine* 36:285-294, 1985.

The risk of myocardial infarction (MI) among women under 50 years of age is increased fivefold among smokers; however, MI is uncommon in younger women in the absence of coronary risk factors. Cigarette smoking and diabetes mellitus are major contributors to coronary risk. Coronary disease in women is more likely to be angina pectoris than MI or sudden death. MI in women is characterized by increased morbidity and mortality, an excess of congestive heart failure, and a less favorable response to coronary bypass surgery. Psychosocial complications are greater and return to work is less likely. (Auth. Abs. Mod.)

86–0166. World Health Organization. **Primary Prevention of Coronary Heart Disease. Report on a WHO Meeting.** World Health Organization, Regional Office for Europe, Copenhagen, EURO Reports and Studies 98, 1985, 100 pp.

The third European Conference on Primary Prevention of Coronary Heart Disease (CHD) concluded that control and eventual eradication of smoking is an important component in effective CHD prevention. This action requires a series of well-coordinated activities at the individual, community, national, and international level. History reveals that individuals and societies can live without tobacco and recent experience from individual countries shows that this goal is attainable this century. Specific initiatives recommended include (1) maintenance of antismoking advice, cessation courses and clinics, and special approaches to high risk groups; (2) prohibition of advertising, creation of smoke-free areas, and adequate educational programs to discourage smoking; (3) state legislation on advertising, banning of vending machines, increasing taxation, and prohibition of sales to minors (essential steps at the national level); and (5) international action to regulate the export and import of tobacco, to compensate growers for loss of income, and to rearrange resources and manpower in preparation for smoking control. Recommendations are also presented for prevention of CHD by changing social values and other health behaviors (diet, alcohol consumption, and physical activity).

86–0167. Yarnell, J.W.G.; Sweetnam, P.M.; Elwood, P.C., et al. **Haemostatic Factors and Ischaemic Heart Disease. The Caerphilly Study.** *British Heart Journal* 53(5):483-487, May 1985.

Hemostatic factors may be independently more predictive of ischemic heart disease than such risk factors as smoking, plasma cholesterol concentration, and hypertension. In a preliminary report from the Caerphilly study, four hemostatic factors showed univariate associations with prevalent ischemic heart disease after adjusting for age. These factors were fibrinogen concentration, plasma viscosity, white cell count, and heparin—thrombin clotting time. Age and these hemostatic variables were entered into a stepwise multiple logistic regression analysis; after age, white cell count and heparin—thrombin clotting time remained significantly associated with ischemic heart disease. Further regression analyses indicated that diastolic blood pressure contributed additionally to association with ischemic heart disease, but smoking did not. (Auth. Abs. Mod.)

PREGNANCY AND INFANT HEALTH

86–0168. Aaronson, N.K.; Ershoff, D.H. **Smoking Cessation in Pregnancy: A Self-Help Approach.** *Addictive Behaviors* 10:103-108, 1985.

The successful home-correspondence self-help program described facilitated smoking cessation and abstinence during pregnancy. A smoking cessation program was provided for all pregnant women attending a health maintenance organization's prenatal clinic who reported that they were current smokers (n=35) or that they had quit at pregnancy onset (n=23). The behavioral modification cessation program, introduced in the clinic, used a home-correspondence format with 7 weekly mailings with a telephone answering system adjunct. At followup, all women identified at baseline as self-initiated quitters reported continued abstinence and urine thiocyanate assays confirmed self-reported data in 82 percent. Results of a multivariate analysis identified three factors (gravida, number of years of smoking, and number of friends who smoke) as significant predictors of self-initiated quitting. Of the 35 baseline smokers, 10 had stopped smoking at postprogram assessment. Available urine thiocyanate assays confirmed nonsmoking status in all cases. Results indicated that four variables (gravida, severe nausea, baseline smoking rate, and spouse's smoking status) were significant predictors of quitting. A majority of both self-initiated quitters and postprogram quitters reported that the program was helpful. (Auth. Abs. Mod.)

86–0169. Allen, C.D.; Ries, C.P. **Smoking, Alcohol, and Dietary Practices During Pregnancy: Comparison Before and After Prenatal Education.** *Journal of the American Dietetic Association* 85(5):605-606, May 1985.

Information on smoking habits and other lifestyle practices (including alcohol and diet) was collected in a study on behavior patterns before and during pregnancy to facilitate development of more effective prenatal education. Of the 75 women (mean age 27 years, mean educational level 14 years) who were attending prenatal clinics, 60 percent were in the first trimester of pregnancy and carrying their first child. Smoking behavior changed significantly. Of 15 women (20 percent) who had reported smoking >20 cigarettes/day at onset of pregnancy, 9 were still smoking at time of pretest, but were smoking <15 cigarettes/day. Further decreases were observed in two women following prenatal education. It is concluded that women are especially motivated during pregnancy to change smoking and alcohol consumption behavior patterns, perhaps because these are specific negative behaviors and easily recognized.

86–0170. Balling, R.; Beier, H.M. **Direct Effects of Nicotine on Rabbit Preimplantation Embryos.** *Toxicology* 34(4):309-313, March 1985.

Results suggest that the critical concentration of nicotine at which direct toxic effects can be observed is in the range of 1 X 10^{-3} mol, which is much higher than the blood concentrations of 10^{-6} to 10^{-7} mol that may be expected after smoking. The direct effects of various nicotine concentrations on in vitro development of 1-cell rabbit preimplantation embryos and on DNA synthesis of 4-day-old rabbit blastocytes was investigated. Nicotine concentrations lower than 1 X 10^{-3} mol had no effect on the development of preimplantation embryos. When a nicotine concentration of 1 X 10^{-3} mol was added to the culture medium, only 25 percent of embryos developed into a blastocyst compared with 43 percent of control embryos. Nicotine concentrations of 2 X 10^{-3} mol and higher totally inhibited normal in vitro embryonic development. Nicotine did not adversely affect (^{3}H)thymidine incorporation by 4-day-old embryos up to a concentration of 5 X 10^{-4} mol. However, higher concentrations resulted in a marked decrease in DNA synthesis, exhibiting a steep dose—response curve. It was demonstrated that nicotine is accumulated by some tissues including bronchi, uterine lumen of pregnant rabbits, and rabbit preimplantation embryos.

86–0171. Etzel, R.A.; Greenberg, R.A.; Haley, N.J., et al. **Urine Cotinine Excretion in Neonates Exposed to Tobacco Smoke Products In Utero.** *Journal of Pediatrics* 107(1):146-148, July 1985.

Cotinine, the major metabolite of nicotine, was present in urine of neonates of smoking mothers, and excretion was significantly greater in neonates of smokers than in neonates of nonsmokers. The initial median cotinine/creatinine ratio was 1233 ng/mg (range 14 to 3891 ng/mg) in neonates of smokers and 14.5 ng/mg (range 0 to 40.6 ng/mg) in neonates of nonsmokers. Only one infant whose mother smoked had a cotinine/creatinine ratio <40 ng/mg, and one infant of a nonsmoking mother had a cotinine/creatinine ratio >40 ng/mg. Among neonates of smokers, there was no clear relationship between newborn urine cotinine/creatinine ratio and maternal cigarette consumption during the 24 hours before delivery ($r=0.46$, $p=0.15$). Cotinine elimination from newborns of smokers appeared to follow exponential kinetics. Average half-life elimination time was 68 hours (range 37 to 160 hours). Measurement of cotinine concentrations in body fluids is suggested as being more advantageous than other biochemical methods. Cotinine, which is specific for tobacco exposure, is produced only in vivo. It has a long circulating half-life in adults (19 to 40 hours compared with 30 to 110 minutes for nicotine) and can be measured by radioimmunoassay at very low concentrations.

86–0172. Gordon, C.C., Jr. **Smoking During Pregnancy.** *Delaware Medical Journal* 57(7):455-459, July 1985.

Approximately 25 to 30 percent of women in the United States smoke during pregnancy. A woman who consumes a pack of cigarettes/day may spend as much as 10 percent of her day smoking. Nicotine and carbon monoxide are the smoke constituents usually implicated as having adverse effects on the fetus. Effects include decreased birth weight, increased incidence of prematurity, a greater probability of spontaneous abortion, and increased perinatal mortality. In the mother, smoking is associated with poor maternal weight gain, increased fetal wastage in pre-eclamptics, and increased incidence of antepartum hemorrhage. Many obstetricians who considered smoking a matter of personal lifestyle intervened only when smoking exacerbated existing medical conditions. However, physicians are now encouraged to take an active role in smoking intervention, using routine office visits as an opportunity to express concern over smoking habits and provide information about the hazards of smoking. It is suggested that maternal instincts should make women more receptive to quitting for the sake of their own and their infant's health.

86–0173. Lin, C-C. **Intrauterine Growth Retardation.** In: Wynn, R.M. (Editor). *Obstetrics and Gynecology Annual*, Volume 14. Norwalk, Connecticut, Appleton-Century-Crofts, 1985, pp. 127-221.

Perinatal mortality has been used as an index of development level in a community or a country reflecting socioeconomic status, living standards, educational levels, cultural background, and quality of medical care. In the United States, perinatal mortality is related to low birth weight. Intrauterine growth retardation (IUGR) has been recognized as the second most important cause of low birth weight, second only to the problem of prematurity. Most current and widely accepted definition of IUGR is birth weight below the 10th percentile for gestational age. Maternal cigarette smoking has been correlated with birth of IUGR infants, with prematurity, and with an increase in perinatal deaths. Cigarette smoking was found to cause fetal hypoxia through two independent mechanisms: (1) an acute effect caused by nicotine activation of catecholamine release resulting in vasoconstriction, and a decrease in utero-placental perfusion; and (2) a prolonged reduction of fetal oxygenation secondary to an increase in maternal carboxyhemoglobin level. Described in this review are (1) possible pathophysiologic mechanisms by which IUGR is produced; (2) available clinical clues and laboratory aids in making prenatal diagnosis of IUGR; and (3) suggested guidelines for clinical management to maximize fetal outcome in IUGR pregnancy.

86–0174. Magnus, P.; Berg, K.; Bjerkedal, T., et al. **The Heritability of Smoking Behaviour in Pregnancy, and the Birth Weights of Offspring of Smoking-Discordant Twins.** *Scandinavian Journal of Social Medicine* 13:29-34, 1985.

Smoking was found to be a direct cause of reduced birth weight in offspring. Questionnaire information on smoking habits during pregnancy was collated for 341 monozygotic (MZ) and 321 dizygotic (DZ) female twin pairs from a population-based Norwegian Twin Panel. In a multifactorial model, the intrapair correlation in smoking was 0.797 (±0.042) in MZ and 0.443 (±0.075) in DZ twin pairs, indicating a substantial genetic influence on liability to smoke in pregnancy. Questionnaire information was linked with birth records in the Medical Birth Registry of Norway, and birth weights of offspring of 62 MZ and 100 DZ smoking-discordant twin pairs were studied. Offspring of smoking MZ twins weighed 127 g less than offspring matched by birth order of nonsmoking co-twins. (Auth. Abs. Mod.)

86–0175. Metcoff, J.; Costiloe, P.; Crosby, W.M. **Effect of Food Supplementation (WIC) During Pregnancy on Birth Weight.** *American Journal of Clinical Nutrition* 41(5):933-947, May 1985.

Infants of smokers who participated in a USDA food supplementation program were significantly heavier than infants of smokers who did not participate. Of 824 women screened, 410 were enrolled at midpregnancy in a prospective, randomized, controlled nutrition study. It was predicted that of these, 226 would have small or large infants and that 184 would have average-sized infants. A total of 238 mothers received USDA Women, Infants, and Childrens (WIC) Food Supplementation vouchers. Leukocyte protein synthesis (as a cell model) was significantly higher ($p=0.009$) at 36 weeks gestation in mothers receiving the supplement. Mean birth weight of their infants was greater (3254 vs. 3163 g, $p=0.039$), after adjustment for sex, gestational age, prenatal visits, pregnancy interval, smoking, and previous low birth weight infants. Controlling for entry weight obviated significance of the difference, except for supplemented smokers (>10 cigarettes/day) whose babies were significantly heavier (mean 168 g, $p=0.017$) than those of unsupplemented smokers. It is suggested that the food supplementation program partially protects fetal growth in smokers. (Auth. Abs. Mod.)

86–0176. Resnik, R.; Conover, W.B.; Key, T.C., et al. **Uterine Blood Flow and Catecholamine Response to Repetitive Nicotine Exposure in the Pregnant Ewe.** *American Journal of Obstetrics and Gynecology* 151(7):885-891, April 1985.

Plasma nicotine concentrations typical of human smoking failed to produce any significant alteration in maternal catecholamines, uterine blood flow, heart rate, or mean arterial pressure in pregnant ewes. A nicotine dose of 0.2 mg/minute for 5 minutes in a chronically catheterized pregnant ewe equipped with electromagnetic flow probes around both uterine arteries produced mean plasma nicotine concentrations of 23.1 ± 1.1 ng/mL SEM ($n=17$) immediately following infusion. The same dose was then infused every 30 minutes for 4 hours, and aliquots of blood were drawn immediately before and after nicotine infusion for determination of plasma catecholamines. No significant alterations in plasma epinephrine and norepinephrine were observed, and no significant changes in uterine blood flow occurred. It is concluded that there is a species difference between sheep and man with respect to the nicotinic threshold for catecholamine release.

86–0177. Said, G.; Lellouch, J.; Patois, E., et al. **Incidence de la Consommation Familiale de Tabac sur les Coliques du Nourrisson. [Influence of Family Tobacco Consumption on Infant Colic.]** *La Presse Medicale* 14(14):790, April 6, 1985, French.

The incidence of postprandial colic in infants and its relationship to parental smoking was investigated in newborns (<3 months) who were seen at a pediatric clinic in France. Parents were questioned about smoking habits, education level, socioeconomic status, method of infant feeding, and incidence of digestive symptoms, including regurgitation, vomiting, gas, and crying associated with or without pain after meals. Of the 256 infants, 147 had no history of postprandial colic and the remaining 109 were reported to cry constantly after meals with signs of pain and suffering. Data showed that paternal smoking was significantly associated with colic. When fathers reported smoking 0, 1 to 10, 11 to 20, or >20 cigarettes/day, 32, 45, 69, and 91 percent of infants in each group were reported to have experienced colic ($p<0.001$). When the mother smoked between 1 and 30 cigarettes/day and the father was a nonsmoker, only 57 percent of infants had colic. When both parents smoked, 81 percent of the infants experienced colic. Parental smoking did not appear to affect incidence of evening colic. Breast-fed infants had a lower prevalence of colic than artificially fed infants, probably as a consequence of less smoking among parents of breast-fed infants.

86–0178. Song, B.-J.; Gelboin, H.V.; Park, S.S. **Monoclonal Antibody—Directed Radioimmunoassay Detects Cytochrome P-450 in Human Placenta and Lymphocytes.** *Science* 228(4698):490-492, April 26, 1985.

Placentas from women who smoked cigarettes contained greater amounts of aryl hydrocarbon hydroxylase-(AHH) and ethoxycoumarin (ECD)-inducible cytochrome P-450 than placentas from nonsmokers. A monoclonal antibody (MAb)-directed radioimmunoassay was developed that detects epitope-specific cytochrome P-450 in human placentas and peripheral lymphocytes. Because the radiommunoassay is based on MAb 1-7-1, it is a specific probe for a type of cytochrome P-450 responsible for the AHH and ECD activities induced by smoking. In women who smoked, 10 μg of placental microsomes inhibited MAb binding 10 to 40 percent; 50 or 100 μg inhibited total binding up to 90 percent. Little inhibition (< 10 percent) was observed with placental microsomes from nonsmoking women. Catalytic activity of the AHH-active cytochrome P-450 was less stable than the MAb-specific epitope detected by the radioimmunoassay, indicating that the assay is more reliable and specific than measurement of cytochrome P-450 activity in tissues. Application of the assay to blood lymphocytes showed that treatment with benz(*a*)anthracene resulted in a greater amount of MAb-specific cytochrome P-450. (Auth. Abs. Mod.)

86–0179. Stock, D.L.; Streissguth, A.P.; Martin, D.C. **Neonatal Sucking as an Outcome Variable: Comparison of Quantitative and Clinical Assessments.** *Early Human Development* 10(3/4):273-278, January 1985.

Infant sucking ability (subjective sucking reflex score and mean pressure score) was determined in 101 infants whose mothers had been interviewed during pregnancy concerning nicotine and alcohol consumption. The two sucking measures were significantly related ($p=0.037$): infants with weak reflex scores showed significantly lower mean pressure scores compared with those with an adequate sucking reflex. Mean sucking pressure was significantly related to both maternal alcohol and nicotine intake. The nicotine/alcohol use interaction term was also significantly related to sucking pressure. However, reflex sucking scores were not significantly related to maternal smoking, alcohol intake, or the interaction term after controlling for examiner effects. The lack of a relationship between the subjective reflex score and maternal tobacco and alcohol use indicates that this reflex measure may not be precise enough for use as an outcome measure at moderate levels of maternal tobacco and alcohol exposure.

86–0180. Swaab, D.F.; Mirmiran, M. **The Influence of Chemicals and Environment on Brain Development; "Behavioral Teratology."** *Progress in Clinical and Biological Research* 163B:447-451, 1985.

Recent research indicates that neurotransmitters such as acetylcholine, noradrenaline, and dopamine, which are essential for normal fetal brain development and function, are affected by nicotine. Such effects include fetal brainstem cell death and retarded mental development. The influence of chemicals on the developing child is an important health problem, particularly in view of the enormous psychological and economic burdens that mental retardation or disturbed behavior imposes on parents, on the affected children, and society. Chemicals may be (1) present in food, water, or air as industrial or laboratory chemicals, household products, agricultural chemicals, food and fuel additives; (2) taken at the mother's own initiative (e.g., self-medication, alcohol, smoking, or drug addiction); (3) prescribed to the mother as a medicine during pregnancy (survey data showed that women in the United States take an average of 11 different drugs in the course of pregnancy); (4) delivered to the newborn via mother's milk (medicines and environmental chemicals such as insecticides, alcohol, nicotine, marijuana); or (5) prescribed directly to the child. Smoking (50 percent of pregnant women smoke) and alcohol (85 percent drink some alcohol) can impair brain development of the fetus. It is suggested that the medical profession be made aware that the immediate beneficial effects of many drugs may be offset by induction of permanent behavioral and psychological defects in the developing child.

86–0181. Tuttle, S.; Aggett, P.J.; Campbell, D., et al. **Zinc and Copper Nutrition in Human Pregnancy: A Longitudinal Study in Normal Primigravidae and in Primigravidae at Risk of Delivering a Growth Retarded Baby.** *American Journal of Clinical Nutrition* 41(5):1032-1041, May 1985.

Zinc and copper concentrations in plasma of 33 normal healthy primigravidae (group A) and 31 primigravidae at risk of delivering growth-retarded babies (group B) were unaffected by smoking or by method of feeding, and no correlation was found with percentile birth weight distribution. Smoking decreased plasma volume expansion, but the decrease was not sufficient to produce differences in intravascular masses of zinc and protein between nonsmokers and smokers. Neither group studied received mineral or vitamin supplements. In group A, plasma zinc concentration declined as plasma volume increased between 14 weeks and 35 weeks. Intravascular mass of zinc increased and showed significant correlation with intravascular mass of albumin. Both were significantly lower in group B, reflecting poorer plasma volume expansion. Plasma copper concentration mirrored increase in plasma ceruloplasmin and was comparable in both groups. In both groups daily dietary zinc intake at 30 weeks was approximately half the Recommended Dietary Allowance. (Auth. Abs. Mod.)

86–0182. Ugen, K.E.; Scott, W.J., Jr. **Potentiation of Acetozolamide Induced Ectrodactyly in Wistar Rats by Vasoactive Agents and Physical Clamping of the Uterus.** *Teratology* 31(2):273-278, April 1985.

Nicotine as a vasoactive agent potentiates acetazolamide-induced forelimb ectrodactyly (missing digits) in Wistar rats. Vasoactive agents administered alone do not produce forelimb ectrodactyly and are not known to be inhibitors of carbonic anhydrase. Physical clamping of uterine horns in addition to oral acetazolamide administration increases frequency of forelimb ectrodactyly, suggesting that decreased uterine blood flow can potentiate acetazolamide teratogenesis. Since the vasoactive agents used are reported to possess uterine vasoconstrictive activity, a decrease in uterine blood flow is a plausible mechanism for the potentiative ability of these agents. (Auth. Abs. Mod.)

86–0183. Vahakangas, K.; Rajaniemi, H.; Pelkonen, O. **Ovarian Toxicity of Cigarette Smoke Exposure During Pregnancy in Mice.** *Toxicology Letters* 25(1):75-80, April 1985.

Results suggest that primordial and small primary follicles may be more sensitive to components in cigarette smoke during fetal life than in adulthood. The effects of cigarette smoke on the number of oocytes in ovaries of pregnant mice and their offspring were investigated by exposing pregnant C57BL/6 and DBA/2 inbred strain mice to the smoke from two cigarettes, 1 hour/day, during days 1 through 18 of pregnancy. Additionally, 7,12-dimethylbenz(*a*)anthracene (DMBA) was administered to other mice on day 15 of pregnancy to confirm that the animals were basically sensitive to chemically induced ovotoxicity. Both mothers and offspring were killed at the age of 21 to 22 weeks and ovaries were analyzed for number of primordial follicles and small primary follicles. Cigarette smoke exposure during gestation did not affect the number of primordial follicles in ovaries of mothers, whereas counts were significantly decreased (31 percent) in ovaries of DBA/2 offspring and decreased, although not significantly (20 percent), in ovaries of C57BL/6 offspring. DMBA (5 to 50 mg/kg) decreased oocyte counts in mothers in a dose-dependent manner. At the same doses, DMBA reduced the viability of the offspring. (Auth. Abs. Mod.)

86–0184. Warburton, D. **Effects of Common Environmental Exposures on Spontaneous Abortion of Defined Karyotype.** *Progress in Clinical and Biological Research* 163C:31-36, 1985.

Cigarette smoking during pregnancy is a risk factor for spontaneous abortion of chromosomally normal embryos, and data show a dose—response relationship with the number of cigarettes smoked. In those who smoke a pack/day, the odds ratio is increased to about 1.5, and although not very large, the effect is considered to be highly significant and should be added to other known consequences of cigarette smoking on reproduction, i.e., low birth weight and earlier age of menopause. An age-dependent frequency of trisomy in abortions has also been associated with maternal smoking. Unlike the smoking effect on rate of abortions, the trisomy effect occurs with smoking prior to pregnancy. Data show a decreased rate of trisomic abortions in very young women who smoke, and an increased rate in smokers over age 30. Odds ratios for "ever smoked" in women with trisomic abortions compared with controls is about 0.5 in very young women and about 2.0 in women over age 35. Spontaneous abortion, defined as a pregnancy termination before 28 weeks gestation, is the most common adverse reproductive outcome, occurring in 15 to 20 percent of all recognized pregnancies and perhaps in an equal number of unrecognized pregnancies terminating between the time of implantation and time of first missed menses.

86–0185. Ylikorkala, O.; Viinikka, L.; Lehtovirta, P. **Effect of Nicotine on Fetal Prostacyclin and Thromboxane in Humans.** *Obstetrics and Gynecology* 66(1):102-105, July 1985.

Although nicotine may not be the cause of prostacyclin changes in infants of smoking mothers, its potential inhibitory activity on platelet thromboxane A_2 formation may protect against development of hypertensive pregnancy complications. To study the effect of nicotine on fetal prostacyclin and thromboxane A_2, specimens from umbilical arteries of infants born to healthy nonsmoking mothers were superfused in absence or presence of nicotine (50 to 10,000 μg/mL) and release of 6-keto-prostaglandin $F_{1\alpha}$ (a breakdown product of prostacyclin) and thromboxane B_2 (a metabolite of thromboxane A_2) was measured. Baseline production of 6-keto-prostaglandin $F_{1\alpha}$ was unaffected by nicotine. To study the effect of nicotine on thromboxane A_2 synthesis by fetal platelets, thrombin-induced platelet aggregation and consequent thromboxane A_2 synthesis were allowed to occur in whole cord blood in absence or presence of nicotine (10 to 500 μg/mL). Nicotine inhibited thromboxane A_2 synthesis from baseline level (107.3±7.1 ng/mL) by 15 to 93 percent. This inhibition was also seen in thromboxane A_2 synthesis starting from exogenous arachidonic acid, suggesting that nicotine inhibits either cyclooxygenase or thromboxane A_2 synthetase in fetal platelets. (Auth. Abs. Mod.)

OTHER DISEASES AND CONDITIONS

86–0186. Berkowitz, G.S.; Kelsey, J.L.; LiVolsi, V.A., et al. **Risk Factors for Fibrocystic Breast Disease and Its Histopathologic Components.** *Journal of the National Cancer Institute* 75(1):43-50, July 1985.

Results of a case—control study showed a negative relationship between current cigarette smoking and fibrocystic breast disease. The relationship between various sociodemographic, reproductive, and other factors to the occurrence of fibrocystic breast disease was evaluated in 590 women with biopsy-proven fibrocystic breast disease and 1,018 women with other surgical conditions. Among premenopausal women, multivariate analysis suggested that high socioeconomic status, Jewish religion, low parity, history of benign breast disease, history of breast cancer in the mother or a sister, and low Quetelet index were associated with increased odds ratios (OR) for fibrocystic breast disease. Similar analysis of postmenopausal women revealed increased OR for women with high socioeconomic status, late age at menopause, and history of benign breast disease. However, current smokers and those who had had a tubal sterilization had significantly reduced odds of fibrocystic disease; the adjusted OR for current smokers was 0.8 compared with 1.2 for ex-smokers. There was no convincing evidence of linear trends according to degree of epithelial atypia for any of the variables considered. (Auth. Abs. Mod.)

86–0187. Burman, L.A.; Norrby, R.; Trollfors, B. **Invasive Pneumococcal Infections: Incidence, Predisposing Factors, and Prognosis.** *Reviews of Infectious Diseases* 7(2):133-142, March-April 1985.

Retrospective analysis of 494 pneumococcal patients (505 episodes) between 1964 and 1980 showed smoking and alcoholism to be primary contributors to the infection. Pneumococcal infections appeared at all ages, but peaked in infants aged 3 to 24 months and in those above age 60. The ratio of males to females was 2.1:1, probably because of the higher rate of predisposing factors (smoking and alcoholism) among men. At diagnosis, 60 percent had lower respiratory tract infections, 25 percent had meningitis, and 12 percent had pneumococcal septicemia. Underlying disorders that may have contributed to the infection were diagnosed in 23 percent of the children. However, 81 percent of adults for whom information was recorded had defined predisposing factors; 32 percent were alcoholics or drug abusers and 37 percent were smokers. Although data on smoking were often missing from the records, current smoking was confirmed in 116 of the 316 adult patients with pneumonia as the primary or secondary diagnosis, and in 28 patients, cigarette use was the only known predisposing factor. Only 25 patients were reported to be nonsmokers. Vascular disease was common in elderly patients, while underlying bronchopulmonary disease was common in all adults. Lethality, treatment, and prophylaxis are also discussed.

86–0188. Craig, S.; Rees, T.D. **The Effects of Smoking on Experimental Skin Flaps in Hamsters.** *Plastic and Reconstructive Surgery* 75(6):842-846, June 1985.

Inhalation of cigarette smoke equivalent to two packs/day in humans resulted in significantly adverse effects on wound healing in hamsters. Standard axial-patterned dorsal flaps were raised in three groups (10 each) of Syrian golden hamsters. Group A hamsters were exposed to sham smoke throughout the experiment; group B animals were smoke exposed 6 weeks prior to surgery, but not postoperatively; and group C animals were exposed to cigarette smoke 6 weeks prior to and for 2 weeks after surgery, at which time all animals were sacrificed for study. Group A showed no impairment of healing, but in group B there was distal edge flap necrosis (average 3 mm) in 2 of the 10 animals. In group C, 6 of the 10 hamsters sustained between 5 and 10 mm of distal flap necrosis. Comparison of group A with group B resulted in marginally significant differences. Differences between groups A and C were highly significant. The role of carbon monoxide, nicotine, and smoking on catecholamines in the impairment of wound healing is discussed and the benefits of preoperative smoking cessation are reviewed.

86–0189. Engberg, G. **Factors Influencing the Respiratory Capacity After Upper Abdominal Surgery.** *Acta Anaesthesiologica Scandinavica* 29(4):434-445, May 1985.

The analgesic requirement and factors influencing the respiratory capacity after upper abdominal surgery were studied during the first 2 postoperative days in 417 smokers and nonsmokers, aged 17 to 84 years, undergoing surgery in the upper part of the abdomen. Operations were cholecystectomy or choledocholithotomy through a subcostal incision, partial gastric resection, repair of a diaphragmatic hernia, or vagotomy through a midline incision. Pain relief was achieved in a random order either by intercostal block (i.c.b.) and centrally acting analgesics on demand or by centrally acting analgesics alone. Analgesic demand was recorded, and respiratory capacity was monitored by peak expiratory flow rate (PEF). A smaller analgesic requirement and a smaller change in PEF were found after cholecystectomy than after any other kind of surgery. Demand for analgesics was age dependent; patients under 60 years of age demanded more than those aged 60 years and older. Bilateral i.c.b. given after surgery through a midline incision had few advantages, but unilateral i.c.b. following cholecystectomy and choledocholithotomy with a subcostal incision had positive effects. It decreased demand for centrally acting analgesics and resulted in higher PEF values than without i.c.b. for cholecystectomy during the period of effective nerve block and for choledocholithotomy for 2 whole postoperative days. Smokers benefited from i.c.b. for 2 postoperative days. Reduction of PEF after cholecystectomy also seemed to be related to duration of treatment with centrally acting analgesics. (Auth. Abs. Mod.)

86–0190. Hirsch, G.L.; Sue, D.Y.; Wasserman, K., et al. **Immediate Effects of Cigarette Smoking on Cardiorespiratory Responses to Exercise.** *Journal of Applied Physiology* 58(6):1975-1981, June 1985.

Cigarette smoking causes immediate detrimental effects on cardiovascular function during exercise, including tachycardia, increased pulse-pressure product, and impaired O_2 delivery. Effects of cigarette smoking on pulmonary or cardiovascular function, especially under stress by metabolic demands of exercise, were studied in nine healthy male smokers. Each subject performed an incremental exercise test to exhaustion on 2 separate days, one without smoking (control) and one after smoking three cigarettes/hour for 5 hours. Arterial blood gases and pH were measured during rest and all levels of exercise; CO blood levels confirmed absorption of cigarette smoke. Minute ventilation (Ve), end-tidal Pco_2 and Po_2, O_2 uptake (Vo_2), CO_2 production, directly measured blood pressure, electrocardiogram, and heart rate (HR) were recorded every 30 seconds. Dead space-to-tidal volume ratio (Vd/Vt), maximal aerobic capacity ($\mathrm{Vo}_{2\max}$), and anaerobic threshold (AT) were determined from the gas exchange data. Cigarette smoking resulted in a significantly lower $\mathrm{Vo}_{2\max}$, AT, and Vo_2/HR (O_2 pulse) and a significantly higher HR, pulse-pressure product, and pulse pressure ($P < 0.05$) compared with control. Additionally, a trend toward a higher Vd/Vt and arterial end-tidal Pco_2

difference was found during exercise after smoking. (Auth. Abs. Mod.)

86–0191. Kirch, D.G.; Bigelow, L.B.; Weinberger, D.R., et al. **Polydipsia and Chronic Hyponatremia in Schizophrenic Inpatients.** *Journal of Clinical Psychiatry* 46(5):179-181, May 1985.

Heavy and abusive use of tobacco is a common symptom of hyponatremia and associated severe complications of seizures, coma, and death among psychiatric patients. Common characteristics also include diagnosis of chronic undifferentiated schizophrenia, early onset of illness, extended hospitalizations with minimal response to neuroleptic medications, and relatively high frequency of tardive dyskinesia and brain scan abnormalities. Clinical history and laboratory data from eight chronically hyponatremic psychiatric inpatients were examined to identify schizophrenics who might develop the problem and to institute treatment approaches. All patients were smokers and three abused tobacco to such a degree that monitoring of cigarettes was required for patient safety. Water loading in three patients showed responses consistent with inappropriate secretion of antidiuretic hormone. Potential pathophysiologic mechanisms and treatment considerations are discussed. (Auth. Abs. Mod.)

86–0192. Koivisto, V.A. **Various Influences on Insulin Absorption.** *Netherlands Journal of Medicine* 28(Supplement 1):25-28, 1985.

Data indicate that diabetics who smoke need 15 to 20 percent more insulin than nonsmokers and the dose increases with increasing consumption. Factors that affect absorption of injected insulin by diabetics are mediated by changes in local blood flow. In one study, the rate of insulin disappearance from a subcutaneous injection site was reduced 113 percent during 30 minutes of smoking. In the 30 minutes following smoking, insulin disappearance was reduced 31 percent. This lowered absorption rate is probably due to smoking-induced vasoconstriction. However, much of the available data on the various relationships between smoking and insulin levels is contradictory, and further examination is required. The influence of injection site, blood flow, ambient temperature, Finnish saunas, bath temperature, physical exercise, and massage of injection site are also considered.

86–0193. Larsson, L.; Gransberg, L.; Knutsson, E. **Torque-Velocity Relations in the Quadriceps Muscle of Smoking-Discordant Twins With Different Fibre Type Proportions.** *Acta Physiologica Scandinavica* 123(4):515-518, April 1985.

Knee extension torque at different speeds of movement was reexamined in a twin population comprised of seven male smoking-discordant twin pairs (six monozygous and one dizygous) 27 to 51 years of age to explain force:velocity ratio differences of earlier studies. An isokinetic dynamometer was modified for more accurate torque measurements through gravitational forces and control of initiation and acceleration of movements with a computer system. A statistically significant intrapair difference ($p<0.05$) was seen in the speed-dependent torque decline between smoking and nonsmoking twins that conformed with intrapair differences in fiber type proportions, and similar trends were seen when smaller movement ranges were studied. This difference, not observed when the same population was studied with a conventional isokinetic dynamometer, is attributed to (1) inherent methodological errors in conventional isokinetic dynamometers, and (2) torque velocity ratios being based on observations from selected angular positions rather than as an average from several angular positions over a large movement range.

86–0194. Marks, I.N.; Girdwood, A.H. **Recurrence of Duodenal Ulceration in Patients on Maintenance Sucralfate. A 12-Month Follow-Up Study.** *South African Medical Journal* 67(16):626-628, April 1985.

Recurrence of ulcers during 12-month followup (or to recurrence) was higher among smokers (44 percent) than among nonsmokers (31 percent) in the sucralfate treatment group; however, ulcers recurred in 88 percent of smokers and 75 percent of nonsmokers in the control group. The single-blind study of patients with recently healed duodenal ulcers assessed the value of sucralfate in preventing recurrence and established the lowest dose required. Endoscopy was repeated on clinical relapse and routinely at 6 to 12 months. Endoscopic evidence of recurrence was found in 6 of 19 patients (32 percent) taking 1 g sucralfate twice/day (group B), 7 of 15 (47 percent) taking 1 g sucralfate at night (group A), and in 13 of 16 controls (81 percent). Recurrence rates in groups A and B were significantly lower than in the control group ($p<0.05$ and $p<0.005$, respectively). There was also a significant gradient between number of patients in remission at 12 months and amount of medication ($p<0.05$). (Auth. Abs. Mod.)

86–0195. Marwick, C. **Effects of "Passive Smoking" Lead Nonsmokers to Step Up Campaign.** *Journal of the American Medical Association* 253(20):2937-2939, May 24-31, 1985.

Since 1971, when the Surgeon General first pointed out the risks of involuntary smoking, more than 100 papers on the health effects of passive smoking have been published. This research and subsequent estimates of health risks have stimulated a growing nonsmokers' rights movement that has become a major factor affecting public attitudes about smoking. The movement is credited, through peer pressure, with the reduction in smoking that has occurred in the past decade. Since the early 1970s, per capita cigarette consumption in the United States has been decreasing at a rate of about 1 percent per year. Societal pressures are also influencing legal actions restricting smoking in public places. Regulations governing smoking are expected to increase in number because (1) knowledge and perception of the health effects of passive smoking are becoming more widely dispersed; (2) restrictions already enacted have been effective, setting important precedents; and

(3) the costs of smoking is being borne by nonsmokers. In the near future it is expected that insurance companies will implement differential rates based on smoking habits, which should provide a strong incentive for people to modify their unhealthy behavior.

86–0196. Millac, P.; Akhtar, N. **Cigarette Smoking and Cluster Headaches. (Letter).** *Headache* 25(4):223, June 1985.

Chronic periodic migrainous neuralgia (cluster headaches) and its possible link with cigarette smoking may be strengthened by results from a postal survey. Subjects recently diagnosed as having cluster headaches following a neurological consultation were asked, by questionnaire, for duration of symptoms, smoking history, and any observed relationship between smoking and headaches. None related headaches with smoking. Of 65 questionnaires, 33 were returned: 28 from males (mean age 38 years, range 16 to 71 years). Of the total group, 24 had smoked ≥20 cigarettes/day for >10 years; 3 had smoked 10 to 15 cigarettes/day for the same period; 3 smoked pipes; and 3 were nonsmokers. Ten patients stopped smoking after diagnosis of cluster headaches. Seven (former heavy smokers) reported abolition or marked improvement of headaches. Of the other three, only one had smoked 20 or more cigarettes/day. In three other heavy smokers, improvement in headaches was noted after consumption was reduced to <20 cigarettes/day.

86–0197. Offenbacher, S.; Weathers, D.R. **Effects of Smokeless Tobacco on the Periodontal, Mucosal and Caries Status of Adolescent Males.** *Journal of Oral Pathology* 14(2):169-181, February 1985.

Smokeless tobacco use is a significant risk factor in individuals with gingivitis, markedly increasing gingival recession, mucosal pathology, and caries. In students with mouths free of gingivitis, use of smokeless tobacco was not associated with changes in gingival recession, mucosal pathology, or in mean DMF score. Use of smokeless tobacco products, such as snuff and chewing tobacco, was investigated in adolescents (565 males, mean age 13.8 years). Students completed a tobacco use questionnaire and were given intraoral examinations by a team of dentists to determine possible relationship of smokeless tobacco use to gingivitis, gingival recession, mucosal pathology, and caries. Overall smokeless tobacco use was 13.3 percent, much higher than the 1.4 percent who reported cigarette smoking. Pairwise chi square analysis revealed no relationship between smokeless tobacco usage and gingivitis, but gingival recession was significantly elevated in smokeless tobacco users ($p<0.001$). Odds of having gingival recession were nine times greater in students using smokeless tobacco compared with healthy, nonuser cohorts. Frequency of soft tissue pathology was significantly elevated, about sixfold in students who used smokeless tobacco, compared with nonusers ($p<0.01$), principally the result of increased white mucosal lesions in smokeless tobacco users. However, there was no attributable risk for mucosal pathology in smokeless tobacco users who were free of gingivitis. (Auth. Abs. Mod.)

86–0198. Paulin, J.M.; Waal-Manning, H.J.; Simpson, F.O., et al. **The Prevalence of Headache in a Small New Zealand Town.** *Headache* 25(3):147-151, May 1985.

The prevalence, characteristic features, and possible causative factors of headaches (including smoking, alcohol consumption, mental stress, and eye strain) were determined in 1,139 adults (549 men and 590 women) who participated in a 1981 multiphasic health survey in Milton, New Zealand. In the year preceding the survey, 39 percent of men and 60 percent of women experienced headaches. Of the 84 percent who identified at least one specific cause, smoking was listed as a cause by only 10 men (4 percent) and 9 women (2 percent). The most commonly reported causes of headache were too much alcohol, tiredness, mental stress, and eye strain for men and tiredness, mental stress, and eye strain for women. Cigarette consumption was not linked with headache frequency in men, but there was a tendency for women who had more frequent headaches to smoke slightly more. Mean cigarette consumption/day ranged from 6 ± 8 for women with no headaches to 8 ± 12 for those experiencing headaches twice or more/week ($p<0.05$). Psychometric scores for anger, anxiety, and depression were positively related to headache frequency.

86–0199. Preshaw, R.M. **Sex Differences in Morbidity and Mortality From Peptic Ulcer in Canada, 1950-1981.** *Clinical and Investigative Medicine* 8(1):62-67, 1985.

Changes in cigarette smoking habits contributed to a significant decline in mortality from peptic ulcer disease among males in Canada from 1950 to 1981. Between 1965 and 1979, the proportion of smokers among men declined from 55 percent to 39 percent, while the proportion of women who smoked remained constant (31.2 percent in 1965; 30.1 percent in 1979). Gastric and duodenal ulcer mortality and mortality from perforated and bleeding peptic ulcer showed similar trends. Rates of hospitalization for duodenal ulcer among males also declined, with lesser effects among males with gastric ulcer and females with either gastric or duodenal ulcer. Rates of partial gastrectomy and vagotomy and pyloroplasty or gastrojejunostomy declined from 1968 to 1981, especially for males. The trends in peptic ulcer disease were in contrast with overall mortality in Canada during the same period, which showed a similar decline in mortality for both sexes. However, the trends could not be correlated with introduction of H_2 antagonists for treatment of peptic ulcers. (Auth. Abs. Mod.)

86–0200. Setia, U.; Serventi, I.; Lorenz, P., et al. **Nosocomial Infections Among Patients in a Long-Term Care Facility: Spectrum, Prevalence, and Risk Factors.** *American Journal of Infection Control* 13(2):57-62, April 1985.

Respiratory infections were more common in smokers and patients with chronic obstructive lung disease in a study determining incidence, prevalence, and types of nosocomial infections in long-term care facilities. Skin infections were more common in patients who were nonambulatory, diabetic, malnourished, and incontinent. Data were collected over a 6-month period on 460 patients in the long-term care division of a 1,200-bed county hospital to identify risk factors for skin infections, urinary tract infections, respiratory infections, and sepsis. Overall, prevalence of nosocomial infections was 12 percent. Patients with infections had an average of 2.8 diagnoses of underlying disease compared with patients without infections (1.8 diagnoses). Specific risk factors were identified. Thirteen percent of patients with an indwelling urinary catheter had symptomatic urinary tract infections and 100 percent had asymptomatic bacteriuria. (Auth. Abs. Mod.)

86–0201. Thornton, J.R.; Emmett, P.M.; Heaton, K.W. **Smoking, Sugar, and Inflammatory Bowel Disease.** *British Medical Journal* 290(6484):1786-1787, June 1985.

Smoking and high intake of sugar were independently and positively associated with development of Crohn's disease. However, patients with ulcerative colitis were three times less likely to be smokers and seven times more likely to be former smokers than controls. Patients with ulcerative colitis or Crohn's disease, matched with controls for age, sex, social class, and marital status, were classified as smokers or nonsmokers. Patients and controls were prescribed special diets. Of the 30 patients with Crohn's disease, 21 were smokers compared with only 10 controls. Only two patients with Crohn's disease and one control were former smokers. Of the 30 patients with ulcerative colitis, 4 smoked cigarettes compared with 11 of the controls. Interestingly, 14 patients with ulcerative colitis had given up smoking a mean of 27 months before first symptoms of disease; only 2 controls were former smokers. It is still unclear how smoking influences susceptibility to inflammatory bowel disease; nevertheless, although smoking may confer some protection against ulcerative colitis, data suggest that it may increase the risk of Crohn's disease.

BEHAVIORAL AND PSYCHOLOGICAL ASPECTS

86–0202. Adriaanse, H.; Halfens, R.; Drop, M.J., et al. **Physicians, Smoking, and Health in the Netherlands.** *New York State Journal of Medicine* 85(7):394-395, July 1985.

According to recent surveys, 56 percent of practicing physicians in the Netherlands are smokers, which is higher than in the population at large. Of these, 49 percent believe they are smoking too much, 22 percent intend to stop, and 15 percent intend to cut down. In the United States, the percentage of physicians who smoke began a rapid decline in the 1950s, when the relationship of smoking and lung cancer was established. By the late 1970s, the rate (which had been as high as 67 percent) had dropped to below 20 percent. Perception of professional responsibility among Dutch physicians in regard to smoking habits of patients is paradoxical. Although 94 percent agree that "It is part of my task to point out to patients the dangers of smoking" and 61 percent agree that "My personal smoking behavior is relevant to the patient," only 22 percent agree with the concept that their health behavior should set an example for patients. Holland (population 14 million) has only recently become a country with a majority of nonsmokers. The number of men who smoke has decreased from 90 to 41 percent, but the number of women who smoke (33 percent) has increased from the 1958 level (29 percent). The 1983 survey results indicate that the rapid trend toward nonsmoking may be stabilizing.

86–0203. Bittoun, R. **Smoking in France: A Dismal Picture.** *New York State Journal of Medicine* 85(7):407-408, July 1985.

The French medical profession has shown little interest in providing the impetus needed to counteract the use of cigarettes, probably because smoking in France is still socially and culturally acceptable. Despite laws (1976) banning outdoor tobacco advertising, France has one of the highest adult rates of smoking in the world (49 percent among men; 25 percent among women). Surprisingly, 57 percent of medical practitioners are regular smokers. Among students in the health professions, survey data showed that 54.3 percent (medical), 50.4 percent (pharmacy), 47.5 percent (dental), and 64.7 percent (nursing) were smokers. Doctors who smoke believe that smoking, far from being socially degrading like alcohol abuse, is enhancing, characterizes a privileged social class, and is associated with stress in those overwhelmed with work and responsibilities. The image of the French smoker is often that of an intellectual at a cafe, reading or writing and drinking alcohol or coffee. These images are frequently encouraged on television, where debates and lectures often feature intellectuals who light up one cigarette after another. Smoking as a natural social behavior is reflected in the number of regular smokers under the age of 18: 45 percent of girls and 43 percent of boys.

86–0204. Blake, G.H. **Smoking and the Military.** *New York State Journal of Medicine* 85(7):354-356, July 1985.

The link between the tobacco industry and the military is old and enduring. Cigarettes were part of K- and C-rations and became morale boosters to troops fighting overseas. Cigarette advertising praised America's servicemen and servicewomen in two world wars. Peer pressure in the military influences initiation and perpetuation of tobacco use. It is suggested that efforts be made to change the "macho" image of a hard-charging, hard-drinking, cigarette-smoking soldier to one that is hard-charging, physically fit, and nonsmoking by (1) implementing smoking cessation techniques in basic combat training; (2) presenting health promotion topics, including hazards of smoking, regularly to officers and enlisted men participating in formal military education classes; (3) enforcing smoking regulations in military hospitals and sponsoring smoking cessation classes for military personnel and their dependents; and (4) modifying the current health care manpower allocation system by increasing resources to those departments that stress preventive medicine, thereby shifting focus from morbidity to wellness and healthy lifestyles among American military personnel.

86–0205. Canadian Family Physician. **Smoking and Drug Abuse Linked: MD.** *Canadian Family Physician* 31:919, May 1985.

In a recent speech to the Manitoba Chapter of the College of Family Physicians of Canada, Dr. J. MacMillan, a staff physician at the Dogwood Institute in Toronto, discussed the association between cigarette smoking and drug and alcohol abuse among adolescents, stressing that adolescents who smoke abuse drugs more often than their nonsmoking peers. They are twice as likely to be current users of alcohol, 9 times as likely to make illegal use of pills such as stimulants and tranquilizers, 10 times more likely to smoke marijuana, and 14 times more likely to use cocaine at a later stage in life. Preventing the initiation of cigarette smoking among adolescents is the most important activity that can be undertaken for prevention of not only smoking but dependence on all drugs. Trying to stop the dependence process at any other stage is much more difficult and expensive, and is much more likely to fail. Although time and effort are required to stop dependence on cigarettes or other drugs before it begins, it is concluded that the effort is worthwhile and a better use of a physician's time than trying to help an addicted patient. For prevention of cigarette use and dependence it is necessary to emphasize the importance and dangers of experimentation in the drug dependence process and to dispel public myths about drug addiction.

86–0206. Coelho, R.J. **Longest Prior Abstinence and Cessation of Smoking.** *Psychological Reports* 56(2):468-470, April 1985.

Regardless of treatment, longer periods of prior abstinence were positively correlated with successful smoking cessation in a comparison of two treatment programs in which 66 smokers were categorized according to the length of longest prior abstinence. Group 1 had never quit, group 2 had quit for up to 1 month, group 3 had quit for from 1 month to 1 year, and group 4 had quit for 1 year or more. All participants were randomly assigned to two social-learning-based treatments. Subjects who had more prior experience with abstinence, especially those in Group 4, smoked less and were more often abstinent than subjects with less or no prior experience. At 3 months posttreatment, nonsmokers had four times as much prior experience with abstinent behavior as smokers. The implications of the findings for research on cessation of smoking are discussed. (Auth. Abs. Mod.)

86–0207. Coulson, W.R. ***Helping Youth Decide:* "When the Fox Preaches, Beware the Geese."** *New York State Journal of Medicine* 85(7):357-359, July 1985.

The Tobacco Institute is criticized for preaching what it does not practice. "Helping Youth Decide," a 20-page booklet produced by the institute, purports to teach good parent—adolescent communication through a technique of "acceptance, understanding, and permissiveness" applied to a variety of adolescent behavioral problems. The booklet, which was widely distributed among parents and educators, offers instruction in methods for developing decisionmaking skills in adolescents in such important life decisions as whether to drive, to drink, to smoke, to borrow money, to quit school, to take or quit a job, and to marry. Based on methods of nondirective psychotherapy developed in the late 1940s and early 1950s, the technique was resurrected by psychologist Thomas Gordon who applied it to extraclinical settings in numerous books and articles and thereby influenced a burgeoning "parenting" movement. Gordon found, however, that an important class of problem behaviors would not yield to the recommended methods, and it may cause embarrassment at the Tobacco Institute to learn that he offers smoking as the foremost example. Studies show that boys who abstained from smoking had fathers who were intolerant of tobacco or marijuana use and who had high expectations of their sons. Followup (or preaching), essential to successful tobacco advertising, was equally successful in keeping boys from taking up smoking.

86–0208. De Smet, P.A.G.M. **A Multidisciplinary Overview of Intoxicating Snuff Rituals in the Western Hemisphere.** *Journal of Ethnopharmacology* 13(1):3-49, March 1985.

Ethnobotanical, chemical, and general pharmacological aspects of intoxicating snuff rituals among Indians in the Western Hemisphere are reviewed, and nasal pharmacokinetics and efficacy of possible ritual snuff constituents are discussed. Four categories of ingredients have emerged, establishing (in descending strength of confirmation) use of a plant as a ritual ingredient and that a plant contains psychoactive principles: (1) *Anadenanthera, Erythroxylum, Nicotiana, Virola*; (2) *Banisteriopsis, Cannabis, Datura, Ilex guayusa*; (3) *Justicia pectoralis, Pagamea macrophylla, Tanaecium nocturnum*; and (4) *Acorus calamus, Capsicum, Macquira sclerophylla, Piper interitum*. Literature yields convincing clinical evidence that atropine, cocaine, nicotine, and scopolamine are effective following nasal application, but experimental confirmation of efficacy of nasal tryptamine alkaloids is still awaited. In self-experiments, 6.4 mg/kg caffeine produced substantial plasma levels via the nasal route, but 0.5 mg/kg of harmine did not produce measurable plasma levels when taken as a nasal powder. Additional experiments are needed to explain negative results.

86–0209. Dropkin, D. **Smokers, Stopped Smokers and Multidimensional Health Locus of Control.** Doctoral Dissertation, Hofstra University, Hempstead, New York, University Microfilms International 84-18831, 1984, 143 pp.

The common characteristics of smokers who are able to successfully quit without professional help were investigated in a sample of 210 individuals employed by a small Long Island municipality. A package composed of questionnaires for active and abstinent smokers and Multidimensional Health Locus of Control (MHLC) scales was distributed with regular paychecks. Differences in smoking behavior were identified by questions on duration and amount smoked, cessation methods used, smokers in subjects' environment, social support, diet, and coping strategies. Additional comments were also elicited. Results showed the same ratio of self-stopping to treatment-stopping smokers (95:5) as previously reported. Persistence was more prevalent among successful stoppers. Stoppers and would-be stoppers perceived little help from others in cessation attempts, and there were fewer smokers in the successful stoppers' environment than in the environments of active smokers. The MHLC Internal subscale did not differentiate between groups; however, the Chance subscale moved in the direction of predicting differences, with active smokers scoring higher. The dominant coping strategy for successful stoppers was willpower (including thought control), followed by thoughts about progress and food substitutes (including gum).

86–0210. Ernster, V.L. **Mixed Messages for Women. A Social History of Cigarette Smoking and Advertising.** *New York State Journal of Medicine* 85(7):335-340, July 1985.

In a historical review of smoking among women, it is noted that women are getting mixed messages regarding smoking. Cigarette smoking, initially a symbol of emancipation, has since become associated with self-destruction. Currently, cigarettes have a negative image (for health rather than for moral reasons), but more women are smoking than ever before (25 to 30 percent). Evidence suggests that women who are the most "emancipated" (using education as the measure) are no longer likely to be smokers. The tobacco industry deliberately fosters the symbolism of emancipation, and has acknowledged publicly that it is directing much of its contemporary advertising to the female market. Specific brands have been marketed for women (Virginia Slims, Eve, Satin, More, and Ritz), and women's magazines (with the exception of *Good Housekeeping*, which has refused to accept cigarette advertisements) are particular targets. In 1979, ***Ladies Home Journal, Better Homes and Gardens***, and ***McCall's*** displayed as many as 20 cigarette advertisements per issue. In addition, the tobacco industry promotes fashion shows, sweepstakes contests, discount coupons, clothing giveaways, and sponsorship of tennis tours to attract the female market.

86–0211. Fisher, R. **Unobtrusive Observations of Cigarette Smoking.** Doctoral Dissertation, University of Tennessee, Knoxville, University Microfilms International 84-21380, June 1984, 176 pp.

Over a 1-year period, 200 smokers in two cafeterias, a university student center, two restaurant lounges, and a baseball park were unobtrusively observed to collect normative data on smoking patterns of smokers in everyday settings. Data were collected during the smoking of one cigarette (from lighting to extinguishing) on the timing of each puff (inhalation and exhalation), cigarette brand smoked, and sex, age, and weight of the smoker. Results suggest that smoking patterns used by laboratory studies are at variance with how most people actually smoke. Findings are consistent with the hypothesis that nicotine plays an important role in smoking: (1) 199 inhaled the smoke, (2) inhale—exhale patterns were suggestive of a "smoking-to-get-nicotine" behavior, (3) many compensated for low scores on one behavior by scoring higher on another, and (4) smokers of cigarettes with low nicotine ratings smoked differently than smokers of cigarettes with high nicotine ratings. When classified according to smoking behavior, 13 percent were "light" smokers, 74 percent were "average" smokers, 9 percent were "heavy," and 4 percent were "atypical." Data presented could help laboratory investigators improve the external validity of studies.

86–0212. Friedman, L.S.; Lichtenstein, E. **Smoking Onset Among Teens: An Empirical Analysis of Initial Situations.** *Addictive Behaviors* 10:1-13, 1985.

Prompting by peers is characteristic of a large majority of smoking onset situations among adolescents. An in-depth structured interview investigated the first three smoking or smoking pressure experiences of 157 teens, including persistent experimental smokers (who smoked more than 10 cigarettes), minimal experimental smokers (who smoked less than 10 cigarettes), and nonsmokers. Initial situations often involved others of the same sex, and in roughly half of the incidents, another young person was trying a cigarette for the first time. Compared with minimal experimenters, persistent experimenters were exposed to significantly more influences to smoke (such as modeling and social encouragement). Persistent experimenters were more primed to smoke than minimal experimenters, engaging in more premeditation, accepting offers to smoke more readily, and inhaling more frequently. Pleasant emotional and physiological effects discriminated continuers from quitters. Nonsmokers appeared to possess more effective response strategies to refuse cigarettes. Implications of the data for prevention program design are discussed. (Auth. Abs. Mod.)

86–0213. Geekie, D.A. **Sponsorship by Tobacco Companies: CMA's Stand. (Letter).** *Canadian Medical Association Journal* 132(11):1252, June 1985.

The Canadian Medical Association (CMA) has a longstanding policy of rejecting all forms of advertising and other promotions for sale of tobacco and alcohol. In 1969, the CMA recommended to the Government of Canada that advertising of cigarettes in all media and at point of sale be prohibited by law. In 1983, commenting on the sponsorship of amateur sports teams, the CMA listed itself among agencies, organizations, and individuals who disapprove of Canadian Ski Association (CSA) program sponsorship by any segment of tobacco or alcohol industries. It cited scientific evidence linking tobacco to lung cancer, heart disease and circulatory disorders, premature and underweight births, death and injury by fire, bronchiectasis, emphysema, bronchitis, and asthma. The CMA identified smoking as a major health hazard not only for the smoker, but also for those exposed to sidestream smoke. Evidence linking peer models and behavioral attitudes and change, especially among impressionable young adolescents, was stressed. CSA program sponsorship by a tobacco company, and related advertising, has the effect of condoning, sanctifying by peer model, and promoting smoking, especially among the youth of Canada, and is, therefore, inappropriate.

86–0214. Gilchrist, L.D.; Snow, W.H.; Lodish, D., et al. **The Relationship of Cognitive and Behavioral Skills to Adolescent Tobacco Smoking.** *Journal of School Health* 55(4):132-134, April 1985.

The assumption that social skills can affect the onset of tobacco smoking was examined utilizing data from 129 sixth graders to predict smoking behavior 15 months later. The five skill variables that emerged as the best predictors of future smoking were assertiveness, value judgments, consequential thinking, compliance, and negative self-talk. By analyzing discriminant scores based on individual levels of social skills, investigators were able to accurately classify 80 percent of the students as smokers or nonsmokers. Nonsmokers were more assertive, had greater ability to follow through with personal choices, were less compliant when faced with peer pressures to engage in risk-taking behaviors, were more resourceful in proposing alternatives to smoking, made more use of facts about smoking to support their refusal to smoke, and used positive self-statements to reinforce themselves for avoiding smoking. Measures of social skills accounted for 29 percent of variation in adolescent smoking behavior. (Auth. Abs. Mod.)

86–0215. Ginzel, K.H. **The Underemphasis on Smoking in Medical Education.** *New York State Journal of Medicine* 85(7):299-301, July 1985.

General apathy toward tobacco-related issues, particularly among medical and scientific professions, is explored through analyses of medical pharmacology textbooks that deal exclusively with drugs and traditionally cover the topic of substance abuse. A 1981 Federal Trade Commission report revealed that (1) half of the nation's pregnant women were uninformed about the effect of smoking on the unborn child; (2) Americans were ignorant of the relationship between smoking and heart disease; and (3) the public underestimated the connection between smoking and lung cancer. Based on textbook content, considerable uncertainty and controversy is associated with the health threat of smoking. Statements such as "Lung cancer has been correlated with air pollution as well as with other factors, such as smoking habits," are included in medical textbooks published 8 years after the Surgeon General's report on smoking, and 14 years after Hammond and Horn documented the strong influence of smoking on lung cancer. Present lack of attention to tobacco in medical school curricula contrasts sharply with recognition that cigarette smoking, when measured by morbidity and mortality, is the world's most serious and widespread addiction.

86–0216. Glosser, D.S. **Conditioned Craving in a Sample of Cigarette Smokers.** Doctoral Dissertation, Boston University, University Microfilms International 84-13168, 1984, 104 pp.

Effects of exposure to visual stimuli related to cigarette smoking on subsequent craving and smoking were assessed in a random sample of 40 habitual cigarette smokers. Subjects were divided into four equal groups. Two (S+ groups) were exposed to color slides judged to elicit cigarette cravings and two (S- groups) were exposed to slides judged not to elicit cravings. One S+ group and one S- group remained abstinent for 2 hours following the presentations while the other groups were allowed to smoke at will. Cigarette craving and/or smoking behavior were measured immediately before and after viewing slides and during the 2 subsequent hours. Analysis of covariance (ANCOVA) and planned comparison analyses revealed that exposure to the conditioning stimuli significantly increased subjective cigarette craving. However, no significant increase in the number of cigarettes smoked by the nonabstinent S+ group subsequent to stimulus exposure was observed in relation to the number smoked by the nonabstinent S- group. Results link cigarette smoking and relapse to the growing literature on these phenomena in other addictive behaviors. It is suggested that classical conditioning of certain neurophysiological events serves both to maintain smoking and to cause relapse. The importance to successful smoking cessation of eliminating smokers' conditioned responses to relevant conditioned stimuli is evaluated. (Auth. Abs. Mod.)

86–0217. Grapes, Z.T., Jr. **A Study of Pharmacists' Attitudes and Beliefs Toward the Selling and Use of Cigarettes.** Doctoral Dissertation, University of Mississippi, University, University Microfilms International 84-15697, January 1984, 199 pp.

A questionnaire designed to examine the phenomenon of pharmacists' cigarette smoking and cigarette selling behaviors was mailed to 1,382 registered pharmacists in Mississippi believed to be practicing community pharmacy. Variables investigated included demographic factors, smoking behavior of significant others, and cues important in the decision to abstain from selling cigarettes; a health belief model (HBM), Multidimensional Health Locus of Control (MHLC), and terminal value scale were also included. Of the 352 questionnaires returned, 188 (61 percent) reported that they never regularly smoked cigarettes, 79 (26 percent) were former smokers, and 40 (13 percent) were current smokers. Cigarettes were reportedly sold in 86 percent of the pharmacies, although only 2 percent advertised cigarettes. In the HBM and MHLC scales, pharmacists ranked high on the general health motivation, benefits, and internality components and low on the susceptibility and seriousness components. Marital status, age, and sex appeared to discriminate smoking behavior. The most important cue for not selling cigarettes was the pharmacists' decision that it was contrary to their professional responsibility. The five components of the HBM and MHLC indices and the valuation of health that demonstrated consistent, positive relationships with cues important for not selling cigarettes were powerful others, cues to quit smoking, general health motivation, valuation of health, and the seriousness index.

86–0218. Haley, N.J.; Sepkovic, D.W.; Hoffmann, D., et al. **Cigarette Smoking as a Risk for Cardiovascular Disease. Part VI. Compensation With Nicotine Availability as a Single Variable.** *Clinical Pharmacology and Therapeutics* 38(2):164-170, August 1985.

To determine which nicotine levels provide desired nicotine intake with a minimum of physiologic and biochemical consequences, 12 prescreened subjects were divided into two groups and supplied with cigarettes that varied in nicotine delivery. Both groups were initially monitored while smoking their usual cigarette. At the following visit, smokers in group 1 received incremental increases and smokers in group 2 received incremental decreases in nicotine levels in assigned cigarettes. All subjects were monitored at first exposure, after 1 week of acclimatization to each experimental cigarette, and upon return to their usual brands. Subjects in both groups were unable to compensate fully for nicotine uptake from the lowest nicotine cigarette. In group 1, new nicotine baselines began to develop after 1 week of acclimatization to cigarettes containing 0.9 and 1.3 mg nicotine. New baseline nicotine levels were also noted in subjects receiving decreases in nicotine (group 2) after smoking the cigarette containing 1.3 mg nicotine for 1 week. Carboxyhemoglobin concentrations did not differ from those measured after usual-brand cigarettes. Plasma cotinine concentrations increased as nicotine content per cigarette increased, except when subjects smoked a 1.3 mg nicotine cigarette. Plasma thiocyanate levels did not vary in either group. Systolic and diastolic blood pressures generally did not differ from control values. (Auth. Abs. Mod.)

86–0219. Jackson, R.; Beaglehole, R. **Secular Trends in Underreporting of Cigarette Consumption.** *American Journal of Epidemiology* 122(2):341-344, August 1985.

Self-reported consumption appears to be a reliable indicator of national trends in cigarette smoking habits, according to a study investigating secular trends in underreporting of smoking among New Zealanders. Information on cigarette smoking among the total New Zealand population, aged 15 and over, was collected in two consecutive national censuses (1976 and 1981). Data showed that self-reported per capita consumption of cigarettes declined by 9.4 percent during the 5-year period. A comparison of census data with national cigarette sales data for corresponding years indicated underreporting of cigarette use in the two censuses. However, there was little change in degree of underreporting between 1976 (28 percent) and 1981 (30 percent), and estimated decline in per capita consumption of cigarettes based on sales data (8.6 percent) was similar to the census-based estimate.

86–0220. Kent, D. **Ending the Social Acceptability of Smoking and Tobacco Advertising in New Zealand.** *New York State Journal of Medicine* 85(7):422-424, July 1985.

Cigarette smoking in New Zealand is the greatest preventable cause of death and disease, causing 3,600 deaths annually (15 percent of all deaths). Smoking rates are high among the Maori population, New Zealand's largest ethnic group. Among Maori women, 70 percent of those between 20 and 24 years of age and 55 percent of those between 15 and 19 years of age are smokers compared with 24 percent of other women. The standardized death rate from lung cancer of Maori women (1976 to 1980) was 44/100,000 compared with 12/100,000 for all women. An organization called MASH (Maori Action on Smoking and Health) was launched in 1984 to deal with the ethnic smoking problem. Advertisements for tobacco products were withdrawn from radio and television in 1963, and in 1973 the first voluntary agreement between the Minister of Health and the tobacco industry banned cigarette advertising on billboards and in cinemas. Tobacco advertising, however, has crept back into television through sports sponsorship. ASH (Action on Smoking and Health) was successful in eliminating tobacco sponsorship of the 1990 Commonwealth Games and is pressing to end tobacco company involvement in all sports. The National Heart Foundation, the Government Advisory Committee on Smoking and Health, and the New Zealand Cancer Society and Asthma Foundation also conduct antismoking activities.

86–0221. Kohn, P.M.; Coulas, J.T. **Sensation Seeking, Augmenting-Reducing, and the Perceived and Preferred Effects of Drugs.** *Journal of Personality and Social Psychology* 48(1):99-106, January 1985.

Data suggest that people, or at least students, whose personalities attract them to use of tobacco, alcohol, and marijuana, are attracted more by the general consciousness alteration associated with use than by specific classes of attributed effects (e.g., stimulant vs. depressant). To determine the relationship between sensation-seeking and tobacco, alcohol, and marijuana use, 60 female and 18 male undergraduates were measured by (1) the general and disinhibition subscales of Zuckerman's Sensation-Seeking Scale; (2) the Reducer-Augmenter Scale (RAS); (3) self-reported use of alcohol, tobacco, and cannabis; (4) degree of attribution of stimulant, depressant, and neutral effects to the drugs; and (5) desirability ratings of stimulant and depressant effects ascribed to various drugs. On the RAS, reducing correlated positively with both sensation-seeking measures, and seven of the nine personality vs. drug use correlations were positive and significant. Generally, effects attributed to tobacco, alcohol, and marijuana did not differ by sex, personality, or use; however, frequent drinkers attributed stimulant effects to alcohol more strongly than depressant effects, whereas infrequent drinkers did the opposite. The mean desirability ratings of stimulant and depressant drug effects correlated positively. High disinhibitors rated drug effects of both kinds more favorably than did low disinhibitors. A similar, more favorable evaluation by high general sensation-seekers was significant for male subjects only. Scores on the Reducer-Augmenter Scale were not significantly predictive of subjects' desirability ratings. (Auth. Abs. Mod.)

86–0222. Kristiansen, C.M. **Smoking, Health Behavior, and Value Priorities.** *Addictive Behaviors* 10:41-44, 1985.

The Rokeach terminal value survey with an additional value, "health," and questions on preventive health behavior were completed by 113 respondents in a United Kingdom postal survey. Analyses showed that lighter weight nonsmokers displayed better preventive behavior than heavier weight smokers. Lighter nonsmokers, more than heavier smokers, reported valuing health and were more oriented toward safety and inner-directedness. Heavier smokers were more oriented toward satisfaction and outer-directedness. Preventive behavior of lighter nonsmokers increased with the value of social goals, while preventive behavior of heavier smokers was related to personal goals. Results suggest that smokers and nonsmokers may have different value priorities. Implications of findings for health education are discussed. (Auth. Abs. Mod.)

86–0223. Lefkowitz, P.; Suljaga-Petchel, K. **The Prevalence of Alcoholism in Acute Care General Hospital Patients.** *Mount Sinai Journal of Medicine* 52(4):291-296, April 1985.

Smoking was highly associated with alcoholism in a prospective analysis of the prevalence of alcoholism in acute care hospital patients. A 10 percent sample (n=368) of patients admitted to Beth Israel Hospital over a 2-month period was interviewed using two screening tools: the 10-question brief Michigan Alcoholism Screening Test (b-MAST), and the 4-item CAGE questionnaire, plus additional lifestyle and health habit questions. In the group as a whole, alcoholism prevalence was 7 percent on the b-MAST and 8 percent according to the CAGE questionnaire. However, alcoholism was highly prevalent among smokers, males, service cases, and those with a positive history of illicit drug use. In the whole population, 47 percent were current or ex-smokers. Using the b-MAST, 14 percent of the smokers were alcoholics compared with 1 percent of nonsmokers (p=0.0001). With CAGE, 13 percent of smokers and 4 percent of nonsmokers (p=0.002) met the criteria for alcoholism. The lowest prevalence of alcoholism was found among nonsmokers, females, and Medicare/Blue Cross patients. It is concluded that alcoholism screening may be targeted at specific subgroups and that only one of the two screening tools are necessary.

86–0224. Magnus, P. **Superman and the Marlboro Woman. The Lungs of Lois Lane.** *New York State Journal of Medicine* 85(7):342-343, July 1985.

Fleeting and lingering shots of the Philip Morris Marlboro logo in *Superman II* and its role model implications (smoking by heroine Lois Lane) in a movie viewed primarily by adolescents are discussed. Other alleged associations include using the Marlboro colors in Lois Lane's dress, and the appearances of a truck and taxi with the Marlboro logo. In one scene, Superman bursts through the logo in pursuit of super villains. Although filmmakers defend the antismoking message that was in the film, critics suggest that allowing a current cigarette company to display its brand name so prominently constitutes hypocrisy. Marlboro's role in the film is viewed as the last nudge into a cigarette habit for thousands of girls primed for smoking.

86–0225. Masironi, R.; Rothwell, K. **Smoking in Developing Countries (III).** Geneva, World Health Organization, WHO/SMO/85.1. 1985, 56 pp.

Recent smoking survey results from approximately 30 developing countries are presented to complement an earlier publication describing the increasing incidence of manufactured cigarette use in Third World countries. Data are summarized for each of five geographical areas: Africa (Ethiopia, Ivory Coast, Nigeria, Zambia); America (Brazil, Chile, Cuba); Eastern Mediterranean (Egypt, Israel, Lebanon, Pakistan, Tunisia); South East Asia (Bangladesh, India, Indonesia, Nepal, Sri Lanka, Thailand); and the Western Pacific (Brunei, China, Hawaii, Hong Kong, Korea, Malaysia, Papua New Guinea, Philippines, Singapore, Tahiti). It is concluded that (1) smoking is increasing in developing countries and the increase can be attributed entirely to an increase in cigarette smoking; (2) smoking rates among women are increasing in many of these countries; (3) an increase in cigarette smoking is directly related to an increase in smoking-related diseases; (4) many countries are promoting the tobacco industry in the belief that short-term economic advantages will be achieved; (5) only a few countries have antismoking campaigns; (6) effective antismoking campaigns must be aimed at people ranging in age from 15 to 25 years, since the influence on confirmed smokers is not likely to be as effective; and (7) it is necessary to promote an understanding of the long-term overall economic effect of smoking in developing countries.

86–0226. McNeill, A.D.; Jarvis, M.J.; West, R.J. **Brand Preferences Among Schoolchildren Who Smoke. (Letter).** *Lancet* 2(8449):271-272, August 1985.

If children are susceptible to cigarette advertising, theoretically they will choose to smoke the most popular and the most heavily promoted brands in the United Kingdom (Benson and Hedges, Embassy, and John Player Special). In Greater Manchester, 880 children were surveyed soon after a snooker championship sponsored by Benson and Hedges, which received 28 hours of coverage on BBC television. Of these, 76 percent of smokers stated they preferred Benson and Hedges. In another survey at a girls' school in an inner-city area in southern England, 140 of 193 pupils aged 11 to 16 who admitted having a preference preferred Benson and Hedges. Only 17 percent of adult smokers prefer Benson and Hedges. Why is this brand so popular among the young? Benson and Hedges is one of the more expensive brands, but it is available in packets of 10. Many children reported that local tobacconists sold single cigarettes at 6 or 7 pence each. It would be surprising if it were only by chance that the most heavily promoted cigarette brand in Britain was also the brand most preferred by children.

86–0227. Miller, K.A. **Family Dynamics, Interpersonal Problem-Solving, and the Onset of Early Adolescent Smoking.** Doctoral Dissertation, University of California, Berkeley, University Microfilms International 84-13512, 1983, 249 pp.

To determine the influence of family patterns and interrelational factors on adolescent smoking habits, questionnaires were administered to 449 sixth graders and 679 eighth graders (53 percent Caucasian, 28 percent black, 19 percent other). A two-stage design was used: (1) data on family interactions, personal smoking, and other information were collected; and (2) solutions to sample interpersonal situational dilemmas were analyzed thematically. Analysis of family dynamics showed a positive correlation between smoking by youth and conflict in the home, attacks, disagreements, hierarchical power structures, and a disengaged quality to family decisionmaking. Youthful smokers characterized their families as significantly less cohesive and supportive and as having an atmosphere of disapproval, minimal parental contact, and little intimate knowledge of children concurrent with the presence of numerous unverified assumptions by the parents. In nonsmokers' homes, conflict was minimal while expressiveness was high. Thematic analyses of responses to sample dilemmas showed that smokers exhibited concerns for moral balance, procedural justice, isolated freedom of choice, and satisfaction of desires and viewed their parents as unfair. Nonsmokers interpreted the dilemmas in terms of preserving harmony in relationships, serving the welfare of others, and constructive forms of communication. Consideration of these variables allowed correct designation of 78 percent of cases.

86–0228. Nellis, M.J.; Emurian, H.H.; Brady, J.V., et al. **Situational Suppression of Cigarette Smoking.** *Addictive Behaviors* 10:75-81, 1985.

Smoking rate appears to be influenced by systematic variations in environmental conditions, according to a study that produced a small but reliable decrease in overall smoking behavior by programming activities associated with smoking suppression. Rate of cigarette smoking was observed during work and recreation while subjects participated in two long-term residential experiments. In both experiments, smoking rate observed during work was markedly lower than smoking rate observed during recreation. In Experiment 1, activities were performed in successive 1-hour blocks. Smoking suppression during work was not associated with increase in smoking rate following work. Experiment 2 consisted of treatment days of alternating 30-, 60-, and 120-minute work periods and recreation and control days of no work. Performance of work was again associated with a marked suppression of smoking. In addition, smoking rate for days of work was greater than for days of intermittent work. This effect was not related to length of work periods, suggesting that subjects failed to compensate totally for work-related decreases in smoking. All subjects exhibited partial compensation. (Auth. Abs. Mod.)

86–0229. Scrimgeour, E.M. **Cigarette Smoking in Papua New Guinea. A Model for Keeping a People Down.** *New York State Journal of Medicine* 85(7):420-421, July 1985.

Antismoking groups in Papua New Guinea (PNG), primarily the medical profession, are urging a ban on cigarette advertising and health warnings on cigarette packs. But tobacco, already extensively cultivated in PNG when the first European colonists arrived, is an important and influential commodity. PNG's climate is eminently suitable for growing tobacco, and as most people are subsistence farmers, nearly everyone has access to home-grown, air-cured tobacco. Since 1960, there has been a rapid increase in the demand for flue-cured cigarettes, encouraging various international tobacco companies to extend operations in PNG. Between 1960 and 1979, total annual per capita consumption increased by 121 percent. By 1979, 71 percent of all tobacco consumed was in the form of commercial cigarettes. Tobacco farming was expanded in the highlands, depriving PNG of some of its most valuable food-producing land. Smoking, formerly restricted to men, is now common among women, especially in urban areas. The trend is to start smoking at an earlier age. The effect of tobacco smoking on betel nut chewing is also discussed.

86–0230. Tucker, L.A. **Physical, Psychological, Social, and Lifestyle Differences Among Adolescents Classified According to Cigarette Smoking Intention Status.** *Journal of School Health* 55(4):127-131, April 1985.

Results show that high school boys who are seriously contemplating smoking as adults differ considerably from those who have no such plans; however, the antecedents of smoking are complex and include manifold psychological, physical, social, and lifestyle differences. Differences among 386 high school males, classified by their intention to smoke (i.e., nonintenders, mild intenders, and strong intenders), were studied. Nonintenders were significantly more self-confident, intelligent, emotionally stable, moralistic, conservative, group-oriented, self-controlled, relaxed, and more likely to respond in a socially desirable manner than were strong intenders. Nonintenders also reported greater intentions to attend college and greater varsity athletic participation, were more likely to be residing with their natural mothers, and were more physically fit than were strong intenders. The California Physical Performance Test measuring six traits of physical fitness and Cattell's 16PF Questionnaire assessing manifold dimensions of personality were administered. Self-concept was measured by Rosenberg's Self-Esteem Scale, and body build was assessed using Tucker's Perceived Somatotype Scale and the Body Mass Index. Marital status of parents, exercise experience, church attendance, participation in athletics, alcohol drinking habits, television viewing behavior, intention to attend college, dating behavior, and general demographic information and intention to smoke cigarettes were assessed by written questionnaire. Possible health education and youth smoking prevention strategies are discussed. (Auth. Abs. Mod.)

86–0231. Wetzler, H.P.; Cruess, D.F. **Health Practices in United States Air Force Personnel Compared to United States Adult Civilians.** *Aviation, Space, and Environmental Medicine* 56(4):371-375, April 1985.

Seven physical health habits (adequate rest, sufficient exercise, eating breakfast, no snacking, maintaining a reasonable body weight, no smoking, and use of alcohol in moderation) were investigated in a random sample of U.S. Air Force (USAF) personnel stratified by rank ($n = 6,675$) and compared with those in the U.S. adult population as reflected by the 1972 Health Practices Supplement to the National Health Interview Survey. Overall, 42.9 percent of the USAF responders were current smokers compared with 36.0 percent of other U.S. adults. Rates for men were 43.3 and 40.9 percent, respectively, and for women, 38.1 and 32.1 percent, respectively. In both populations there were more smokers among those aged 35 to 44 years and those with less education (12 years). Results for other health habits revealed that the USAF population had a lower level of breakfast eating, a higher level of snacking, and slept less. Females and older persons in both populations reported less physical activity, and USAF females reported drinking more than other females. The validity of self-reported health practice data is thought to be of considerable importance in these surveys.

86–0232. Zacny, J.P.; Stitzer, M.L. **Effects of Smoke Deprivation Interval on Puff Topography.** *Clinical Pharmacology and Therapeutics* 38(1):109-115, July 1985.

Effects of deprivation interval on smoking topography revealed that smokers do not increase puff volume after long deprivation intervals (up to 300 minutes), but may decrease puff volumes after short deprivation intervals (3 minutes) when puff number and spacing cannot be used as compensatory mechanisms. Puff volume, the amount of smoky air drawn through the cigarette rod into the mouth with each puff, is an important measure in smoking research because it correlates with biologic exposure as measured by expired air carbon monoxide (CO) and plasma nicotine levels. In Experiment 1, subjects were allowed to smoke ad libitum for 1 hour after 3, 30, and 300 minutes deprivation. An increased latency to the first cigarette developed after 3 minutes deprivation, and an increase in number of cigarettes smoked occurred after 300 minutes of deprivation. In Experiment 2, puff number and spacing were held constant to determine if smokers would compensate for long deprivation intervals by more intense smoking, i.e., increased puff volume. Puff volumes and CO boosts did not differ across smoking bouts preceded by either 30, 100, or 300 minutes deprivation. In Experiment 3, average puff volumes and CO boosts were examined during smoking periods with short (3, 10, and 30 minutes) deprivation intervals. Subjects smoked less intensely (lower puff volumes and CO boosts) when smoking was spaced by 3 than by 30 minutes. (Auth. Abs. Mod.)

See also **86–0012, 86–0029, 86–0068, 86–0107, 86–0129, 86–0195, 86–0245**

SMOKING PREVENTION AND INTERVENTION

86–0233. Ackley, E.; Valentine, S. **Smoking Cessation by Patients With Coronary Artery Disease.** *Focus on Critical Care* 12(2):50-56, April 1985.

Smoking is a well-known and documented risk factor for coronary artery disease (CAD). A 54-year-old smoker is three times more likely to have a myocardial infarction (MI) than a nonsmoker; however, research indicates that after sustaining an MI, mortality is reduced 50 percent if a person stops smoking. Nurses can assist patients who want to stop smoking through counseling and use of self-help manuals. Behavioral programs, nicotine chewing gum, and selected alternative techniques can also be effective. Included in this discussion are the physiological and psychological effects of smoking and the addictive effects of nicotine, and successful methods for assisting patients who are going through nicotine withdrawal. Smoking cessation counseling techniques (which are particularly effective for CAD patients about to be descharged from the hospital) are also described. Additional techniques such as hypnosis and acupuncture are reviewed, with a cautionary note regarding rapid smoking (aversive therapy), which can be harmful to patients with CAD. Alternative methods are proposed.

86–0234. Cole, P.; Saloojee, Y. **Smoking Before Surgery: The Case for Stopping. (Letter).** *British Medical Journal* 291(6488):142, July 13, 1985.

Strong agreement is provided in support of a report (*British Medical Journal* 290(6484):1763-1764, June 15, 1985) that advised patients to stop smoking prior to anesthesia and surgery. Data from questionnaires sent to 502 hospitals in Great Britain to investigate whether any official attempts were made to dissuade elective surgery patients from smoking were discouraging. Of hospitals admitting patients to acute surgical wards, 29 percent failed to make any reference to smoking in patient information booklets or letters of admission. The remaining 71 percent informed patients of smoking restrictions, and a substantial minority exhorted smokers to give up smoking while in the hospital. Only 6 percent recommended that patients stop smoking before admission. After admission, 92 percent permitted smoking in day rooms and 31 percent allowed patients to smoke in the wards. It is recommended that hospitals prohibit smoking in short stay wards and day rooms and that the following statement be included in letters of admission: "Please stop smoking on receipt of this letter. Failure to do so may prevent you from having a general anesthetic." Such a period of abstinence would produce a significant improvement in the overall health of patients. See also 86-0036.

86–0235. Dignan, M.B.; Block, G.D.; Steckler, A., et al. **Evaluation of the North Carolina Risk Reduction Program for Smoking and Alcohol.** *Journal of School Health* 55(3):103-106, March 1985.

A school health education program designed to increase knowledge and improve attitudes toward tobacco and alcohol use is described. The program was administered to seventh grade students in two school systems in rural North Carolina; one in the central area (county F) and the other in the western mountains (county A). Interventions consisted of school-based curricula specifically designed to teach about smoking and drinking while addressing local attitudes and values toward alcohol and tobacco. In county F, statistically significant increases in tobacco knowledge ($p<0.0001$) and decreases in attitude scores ($p<0.0001$) were observed. Similar trends for alcohol knowledge and attitudes were observed, but no significant changes were seen in the self-concept or locus of control scales. In county A, significant increases in tobacco knowledge ($p<0.0196$), self-concept ($p<0.0084$), and locus of control ($p<0.0478$) scales were accompanied by a significant erosion in smoking attitudes ($p<0.0003$). Alcohol knowledge increased ($p<0.0001$), but attitudes did not change significantly. It is suggested that education about smoking may have conflicted strongly with community attitudes toward smoking, eliciting a "boomerang" effect.

86–0236. Ernster V.L.; Wilner, S.I. **Non-Smoking Policies in Hospitals.** *Journal of Public Health Policy* 6(2):197-203, June 1985.

Policies on smoking vary considerably across health care institutions. Some are weak, allowing sales of cigarettes and banning smoking only near oxygen, and others are mild, banning sales of cigarettes, allowing patients to be bedded by smoking status, disallowing staff to smoke in patient care areas, and providing waiting and dining areas for nonsmokers. Moderate policies, in addition to the above, allocate two-thirds of visitor and dining areas to nonsmokers. Institutions with strong policies, in addition to all the above, prohibit any smoking in patient rooms, prohibit smoking by staff during working hours, encourage no smoking among employees at time of recruitment and through smoking cessation programs, allow visitors to smoke only in designated areas, and post clear messages (on signs and posters) conveying the hospital's position on smoking to the public. Suggestions for instituting a nonsmoking policy in hospitals or institutions are outlined.

86–0237. Flay, B.R.; Ryan, K.B.; Best, J.A., et al. **Are Social-Psychological Smoking Prevention Programs Effective? The Waterloo Study.** *Journal of Behavioral Medicine* 8(1):37-59, March 1985.

Social influence programs for preventing smoking among adolescents convinced many young experimenters to quit smoking and to remain quitters. Successful smoking cessation by early starters and smoking prevention among later starters were among the findings of a test of smoking prevention curricula emphasizing resistance to social influences. Key methodological limitations in previous programs were addressed. Twenty-two matched schools were randomized to experimental and control conditions. Grade 6 students received a 6-week core curriculum, with additional sessions through Grades 7 and 8. Questionnaires, and saliva samples to validate self-reported smoking behavior, were collected five times over a 2-year period. Cross-sectional and longitudinal analyses examined program impact for five levels of initial smoking experience, ranging from never smoker through regular weekly smoker. Significant program effects are documented, which are most clear for those who had had some previous smoking experience before the program began and for those with smoking peer and family models. (Auth. Abs. Mod.)

86–0238. Fulton, H.B., Jr. **A Pilot's Guide to Cabin Air Quality and Fire Safety.** *New York State Journal of Medicine* 85(7):384-388, July 1985.

Airline passengers are not sufficiently protected from exposure to cigarette smoke, which introduces pollutants at a higher rate than cabin ventilation systems can effectively dissipate. Ventilation capacity is dependent upon engine compressor efficiency, bleed valve operation, air duct cleanliness, security of duct connectors, pressure regulator valve function, air conditioning pack operation, door and window seal integrity, filter porosities, aircraft altitude, and engine revolutions per minute. Most recirculation ventilation systems are designed to increase fuel economy, often at the expense of cabin air quality. Measures to prevent fires aloft resulting from surreptitious smoking in lavatories (the specter raised by banning smoking on short duration flights) are discussed. Many pilots feel that tobacco smoke in the cockpit is an even greater threat to crew health and safety. Early attempts (1976) to ban smoking from the cockpit were rebuffed by the Federal Aviation Administration, which based its judgment on studies that suggested abrupt smoking withdrawal would pose a greater threat to aviation safety than crew smoking. Efforts by nonsmoking pilots to establish a cockpit smoking policy are reviewed.

86–0239. Kowalski, P.A. **After Your Client Quits Smoking: Hospital Pressure vs. Self-Motivation.** *Home Healthcare Nurse* 3(1):27-29, January-February 1985.

The home healthcare nurse can help a hospitalized smoker remain abstinent through support as part of a regimen of continuing care. The first step is to meet in the hospital before discharge to discuss the patient's smoking habit (i.e., the patient's willingness to quit), concentrating on the patient's concerns. Relieving anxieties will help the patient face the problem of smoking realistically; however, the decision to quit must be made by the patient. A thorough understanding of nicotine withdrawal symptoms and accompanying irritability, restlessness, inability to concentrate, and possible weight gain will help the patient through the early stages. The positive aspects, such as fewer coughs, more energy, easier breathing, and cleaner mouth, will help to reinforce the patient's commitment. Incentives and rewards may be effective. Patients who have quit smoking have reported improved sexual ability. Various exercises and activities are suggested to relieve the urge to smoke. The home health nurse is in a position to reinforce the patient's feelings of self-esteem, and if the patient is concerned about gaining weight, the nurse can assist by providing instruction on nutrition. The nurse may provide home care for only a month or two, but in that time the patient can receive the support needed to persevere in the commitment to remain a nonsmoker.

86–0240. Lane, D.J. **The Clinician and Smoking in Great Britain.** *New York State Journal of Medicine* 85(7):391-393, July 1985.

The British Royal College of Physicians is battling to curb smoking through education and legislation. Information on the harmful effects of smoking, disseminated by health education groups, is reaching the public through the mass media, and adolescents through classroom instruction. Government resources fall short, however, against the almost limitless funds of the tobacco industry. Action on Smoking and Health (ASH), a public information agency set up by the college, has become an effective antismoking lobby in Parliament. The two main areas where action could make a difference, but where government has been disappointingly indifferent, are taxation and advertising. The medical profession has no direct voice in fiscal matters; however, it has the right to petition the Treasury (as does the tobacco industry), and does so, especially for increases in tobacco taxation. The ban on television advertising of cigarettes, enacted in 1965, is still the only legislation on the issue; other forms of advertising are uncontrolled or are a matter of voluntary agreements. Guidelines are often flouted; e.g., tobacco company sponsorship of sporting events, which keeps smoking in the public eye. The British Medical Association, also active in antismoking efforts, plans to harrass the tobacco industry and lobby for anticigarette advertising legislation.

86–0241. Laskin, D.M. **Helping Your Patients to Stop Smoking.** *Journal of Oral and Maxillofacial Surgery* 43(4):238, April 1985.

Despite intensive efforts to warn the public about the potential dangers of smoking, over 53 million people in the United States continue to smoke. Since more than 30 million persons visit the dentist's office each year, a large percentage of smokers eventually are referred to an oral and maxillofacial surgeon. These surgeons are in an excellent position to influence the smoking habits of patients by (1) not permitting smoking in office reception areas; (2) having health education materials on the benefits of not smoking available for patients to read; (3) obtaining histories on smokers for counseling; (4) informing smokers about oral health problems associated with tobacco use; (5) providing patients who wish to quit smoking with personal counseling and suitable literature and audiovisual materials; and (6) encouraging and supporting patients through followup telephone calls after surgery.

86–0242. Papier, C.M. **Israel: Gaining Momentum Against Smoking and Cigarette Advertising.** *New York State Journal of Medicine* 85(7):416-419, July 1985.

The annual cost of smoking in Israel is in excess of 388 million dollars, or nearly 2 percent of the gross national product, according to a 1984 estimate by the Israel Society for the Prevention of Smoking. The figure is based on related health-care expenditures, work absenteeism, premature death, and loss of daily productive work time, but does not include losses from smoking-related fires or traffic accidents. In the last decade, smoking has increased only among women over 40 years of age and among adolescent girls. However, children are taking up the habit at younger ages, and from age 13 there is a rapid rise in smoking rates. Among 18-year-olds, 36 percent of males and 30 percent of females are smokers. By age 25, the rate is about 50 percent and remains at that level until age 50. A recent law (July 1984) restricting advertising of tobacco products is considered a major victory for the growing antismoking movement, even though it does not cover government buildings, banks, supermarkets, restaurants, workplaces, airplanes, or trains. A health education program by the Ministry of Health will inform children and adolescents about smoking.

86–0243. Shelley, E.B. **Slow But Steady Progress Against Smoking in Ireland.** *New York State Journal of Medicine* 85(7):400-402, July 1985.

The greatest decline in cigarette smoking in Ireland, as in other countries, has been among the more affluent and better educated. Data from a recent survey showed the proportion of smokers was 40 percent of workers in unskilled occupations, 36 percent of clerical and skilled workers, 27 percent of professional and administrative groups, and 24 percent of farmers. Overall, 34 percent of men and 30 percent of women smoke. Decline in smoking has been slowest in those aged 25 to 34 years. In 1979, 40 percent of the population was under 20 years of age; the most urgent public health problem in Ireland today is preventing young people from becoming addicted to tobacco. Beginning in 1964, restrictions were placed on advertising of tobacco products. The Tobacco Products Acts of 1978 and 1979 updated and extended the regulations. Tobacco company sponsorship of sports events is also regulated. In 1980, the Health Education Bureau began a major antismoking campaign, and in 1984, 160,000 pounds were spent on antismoking activities, including advertising on outdoor billboards (a medium forbidden to the tobacco industry). An educational approach to developing decisionmaking skills in young people, particularly relating to the use of drugs and tobacco, was fostered by the Bureau. Major new legislation in 1985 will reinforce smoking restrictions in public places, prohibit sales of tobacco products to children, and levy a tax on tobacco advertising with revenue to be used for health education.

See also **86–0289**

SMOKING CESSATION METHODS

86–0244. Feldman, J. **An Assessment of the Effectiveness of Nicotine Chewing Gum: Unfulfilled Expectations.** *New York State Journal of Medicine* 85(7):378-380, July 1985.

The Food and Drug Administration (FDA) evaluation of nicotine chewing gum as an aid to stop smoking required two adequate and well-controlled prospective studies showing a statistically significant difference between users and nonusers of the gum. The two studies that formed the basis for FDA approval did not adequately document a benefit of nicotine gum, although both were well-controlled prospective studies showing significant differences between the groups tested. The discussion expands on the inadequacy of the studies, and includes comments on additional data and issues of methodology.

86–0245. Horwitz, M.B.; Hindi-Alexander, M.; Wagner, T.J. **Psychosocial Mediators of Abstinence, Relapse, and Continued Smoking: A One-Year Follow-Up of a Minimal Intervention.** *Addictive Behaviors* 10:29-39, 1985.

The relationship of health beliefs, social support, use of nonsmoking areas, and objecting to another person's smoking with long-term abstinence and relapse were investigated following a group hypnosis minimal intervention session for smoking cessation. Questionnaires completed by the 70 male and 149 female participants prior to and 1 year after treatment defined ex-smokers, recidivists, and continuing smokers. Results showed ex-smokers actively coped with smokers in their environment, avoided other smokers in public places, and received considerable support from spouses and friends. In contrast, recidivists prior to treatment had been unable to quit smoking for extended periods of time and placed greater responsibility on powerful others for their health. Following treatment, recidivists did not actively cope with smokers, were more likely to participate in additional hypnosis, and placed less responsibility for their health on either powerful others or themselves. Posttreatment factors appear to be more important for long-term maintenance of nonsmoking than entry characteristics. Recommendations include incorporation of coping skills training into smoking cessation programs and restrictions on smoking in ex-smokers' environments. (Auth. Abs. Mod.)

86–0246. Rabkin, S. **Relationship Between Weight Change and the Reduction or Cessation of Cigarette Smoking.** *International Journal of Obesity* 8(6):665-673, 1984.

The amount of reduction in consumption was the most important determinant of weight gain following reduction or cessation of smoking, but important sex differences were also found. Body weight and height and serum thiocyanate concentration were measured in 40 men and 67 women before and after participation in smoking cessation programs to determine the relationship between body weight and reduction or cessation of smoking. Body weight increased in only 67.3 percent of cases; however, increases were associated with a greater reduction in consumption. Absence of weight gain was associated with only a small reduction in consumption. Body weight increases after participation in the program were significantly ($p < 0.05$) greater in men than in women despite absence of a significant difference in consumption reduction. Analysis of variance failed to show a significant deviation from linearity in the significant relationship between reduction in tobacco consumption and increase in body weight. A number of variables assessed at study entry (age, age at starting smoking, cigarette consumption, initial body weight, or anxiety level) did not correlate with change in weight in men or women. (Auth Abs. Mod.)

86–0247. South African Medical Journal. **Nicotine Chewing Gum.** *South African Medical Journal* 67(24):953-954, June 15, 1985.

Nicotine-containing chewing gum (Nicorette) has recently been released for use in the Republic of South Africa as a schedule 3 preparation, and physicians are urged to be aware of all the issues surrounding prescription of the gum. The gum is intended for use only as a temporary aid to ease withdrawal in smokers who participate in a behavior modification program. Only patients seriously motivated to stop smoking should be given the gum. Attempts to use the gum in conjunction with cutting down on cigarette consumption will fail. At least 6 pieces/day are needed for a pharmacological effect; 10 to 12 pieces/day is average. Contraindications for prescription of the gum include young age, pregnancy, esophagitis, peptic ulcer, and certain cardiovascular disorders. Data from earlier studies indicate that the rate of long-term abstinence is 27 percent when use of the gum is combined with intensive support, 21 percent when support is minimal, and 10 percent when the gum is used as an adjunct to advice only.

TOBACCO PRODUCT ADDITIVES

86–0248. Boden, R.M. **Branched Chain Saturated Ketones, Organoleptic Uses Thereof and Process for Preparing Same.** United States Patent No. 4,469,892, September 4, 1984, 24 pp.

Various branched chain saturated ketones are described that impart woody, minty, and oriental flavor and aroma characteristics to tobacco and other products. The compounds may be mixed with other synthetic or natural flavorants and are suitable for use in cigarette, cigar, pipe, and chewing tobaccos and snuff. They may be applied to filters, wrappers, packaging materials, tobacco leaf, and tobacco substitutes. The process for synthesizing the compounds is described and sample flavor formations are given. Recommended proportion by weight of the described ketones is between 250 and 1,500 ppm (0.025 and 1.5 percent) of the tobacco smoking material.

86–0249. Chan, W.G.; Houminer, Y. **Smoking Compositions Containing a β-Hydroxy-γ-Ketoester Flavorant-Release Additive.** United States Patent No. 4,538,627, September 3, 1985, 6 pp.

The tobacco compositions described contain between 0.0001 and 2.0 percent by weight of a β-hydroxy-γ-ketoester compound such as dodecyl-3-hydroxy-2,2,3-trimethyl-4-oxopentanoate. Under smoking pyrolysis conditions, the compounds decompose and release a volatile 1,2-diketone that contributes flavor-enhancing properties to mainstream tobacco smoke. The additives can be prepared by reacting equivalent weights of a selected 1,2-diketone with an appropriate carboxylate ester in the presence of a strong base such as a metal amide. The tobacco composition may be composed of natural tobacco filler, reconstituted tobacco, and/or tobacco substitutes.

86–0250. Evers, W.J.; Stork, G.; Mookherjee, B.D., et al. **Synthesis of Triconjugated Dienones and Novel Intermediates Used in Said Process.** U.S. Patent No. 4,451,392, May 29, 1984, 27 pp.

The triconjugated dienones described produce sweet, fruity, and green notes with tagete nuances to smoking tobacco products before and during smoking. An aroma and flavoring concentrate containing one or more of the triconjugated dienones may be added to the tobacco, the filter, or the leaf or paper wrapper. Satisfactory results are obtined if the proportion by weight of the total of dienones to smoking material is between 50 and 1,500 ppm. Any convenient method of incorporation may be employed. Other uses for the triconjugated dienones as additives for perfumes, solid detergents, soap compositions, cosmetic powders, and colognes are described.

86–0251. Fankhauser, P. **Spiranic Compound for Use as a Perfume or Flavor-Modifying Ingredient.** United States Patent No. 4,465,618, August 14, 1984, 5 pp.

A new spiranic compound (6-ethyl-2,10,10-trimethyl-1-oxaspiro(4.5)deca-3,6-diene) is described that can be used as a flavorant in tobacco and other products. The compound imparts a black-currant type of aroma to products and flavor compositions. Recommended proportions are between 0.01 and 10.0 ppm, preferably between 0.1 and 5.0 ppm, of the spiranic compound to the flavored material.

86–0252. Gaisch, H.; Ghiste, P.D.L.; Schulthess, D. **Method of Tobacco Treatment to Produce Flavors.** U.S. Patent No. 4,537,204, August 27, 1985, 6 pp.

An inexpensive method for producing tobacco flavors from amino acids is described. Proteins of biomass produced by assimilation of low molecular weight nitrogen compounds from an aqueous tobacco extract are hydrolytically degraded into an amino acid mixture that is isolated and converted into flavors by reducing sugars and heat. Flavors may be added to smoking products of particularly poor quality to improve their aroma and taste. (Auth. Abs. Mod.)

86–0253. Hall, J.B.; McGhie, J.A.; Vock, M.H. **Hexadienoyl Cyclohexene Derivative.** United States Patent No. 4,458,093, July 3, 1984, 28 pp.

The hexadienoyl cyclohexene derivative described can augment or enhance the floral, hay-like, sweet, and fruity aroma and taste nuances found both prior to and on smoking in main- and sidestream tobacco smoke. Additionally, the derivative imparts fresh, cooling nuances to tobacco smoking articles and the smoking tobacco. The derivative is prepared by (1) treating 1-alpha-acetyl-2-alpha,6,6-trimethyl-3-cyclohexene with refluxing alcoholic base or alkali metal alcoholate; (2) reacting the resulting compound with a dialkyl carbonate using an alkali metal hydride in the presence of an inert solvent; and (3) reacting this product with 2-methyl-3-butyn-2-ol in the presence of a metal alkoxide. At the end of the reaction, the reaction mass is quenched into a weak acid, extracted, and fractionally distilled to yield the hexadienoyl cyclohexene derivative described. The compound and its isomers are also capable of augmenting or enhancing aroma and/or taste nuances of perfumes, detergents, hair preparations, mouthwashes, toothpastes, chewing gums, and foodstuffs.

86–0254. Hall, J.B.; Sanders, J.M.; Siano, J.N. **Flavoring of Alliaceous-Flavored Foodstuffs.** United States Patent No. 4,476,147, October 9, 1984, 43 pp.

An efficient low-cost process is described for producing mixtures of cis and trans isomers of isosolanone and solanone, known terpenoid ketones of burley tobacco that are useful as tobacco flavorants and flavor enhancers. Organoleptically useful intermediates resulting from this process are also described. The process involves reacting a formaldehyde, preferably formalin, with isoveraldehyde in the presence of a secondary amine catalyst. The reaction pressure may be atmospheric, and the preferred temperature range is from 75° to 80° C. The product of this reaction may then be reacted with a methallyl halide and magnesium metal in the presence of an inert solvent. The product is hydrolyzed, producing an organoleptically useful intermediate that may be used as is or reacted further to produce other useful compounds. The flavorants and flavor enhancers described impart minty, herbal, anisic, cedarleaf, pennyroyal, floral, patchouli-like, cooked red beet-like, earthy, garlic, and green aroma nuances to tobacco, perfumes, foodstuffs, medicinal products, toothpastes, and chewing gums.

86–0255. Klemarczyk, P.T.; Dekker, L.; Kiwala, J. **Substituted Methyl Isopropyl Cyclohexenones, Organoleptic Uses Thereof and Process for Preparing Same.** U.S. Patent No. 4,449,008, May 15, 1984, 37 pp.

The use of substituted methyl isopropyl cyclohexenone compounds to enhance smoking tobaccos and cigarette filters is described. In one form the compounds produce woody, peppery, and citrusy aroma in tobacco prior to smoking and sweet, citrusy flavor upon smoking. Other forms of the preparation can be used to augment aroma in perfumes, solid detergents, soap compositions, fabric softeners, cosmetic powders, and colognes.

86–0256. Podraza, K.F. **Smoking Compositions Containing a Dicarbonate Ester Flavorant-Release Additive.** U.S. Patent No. 4,532,944, August 6, 1985, 4 pp.

The tobacco additive described, which enhances flavor of mainstream smoke and aroma of sidestream smoke, features low volatility and sublimation characteristics that permit retention of flavor after long shelf life. Additive compounds of dicarbonate esters pyrolyze into alcohol or phenol compounds that contribute flavor-enhancing properties to smoke. Dicarbonate esters containing aliphatic, alicyclic, and aromatic radicals are dissolved in water, alcohol, or other mixtures and sprayed or injected into tobacco materials. (Auth. Abs. Mod.)

86–0257. Podraza, K.F. **Smoking Compositions Containing a Dioxane Diester Favorant-Release Additive.** United States Patent No. 4,538,628, September 3, 1985, 5 pp.

The smoking compositions described contain between 0.002 and 2.0 percent by weight of a dioxane diester additive, such as 2,5-bis(3-methylvaleryloxy)-1,4-dioxane. At ambient temperatures, the compounds lack mobility and/or volatility. However, at relatively low pyrolysis temperatures, the additive decomposes and releases a volatile carboxylic acid (RCO_2H) that contributes flavor-enhancing properties to mainstream tobacco smoke. The additive is particularly effective for the efficient release of alkanoic acid flavorants such as butyric acid and isovaleric acid. The compounds may be prepared by reacting equivalent weights of an acyl halide compound with glycolaldehyde in the presence of a basic reagent such as pyridine or trimethylamine.

86–0258. Podraza, K.F.; Houminer, Y. **Smoking Compositions Containing a Flavorant-Release Additive.** United States Patent No. 4,540,004, September 10, 1985, 5 pp.

The smoking compositions described contain a tetracarbonate ester, such as 2,5-bis(menthoxycarbonyloxymethylene)-3,6-bis(menthoxycarbonyloxy)-1,4-dioxane as a flavor additive. Under tobacco pyrolysis conditions, the esters release a high yield of alcohols, phenols, and menthol flavor enhancers into mainstream smoke. The compounds are uniquely stable and odorless at ambient temperatures, and decompose at pyrolysis temperatures as low as 150° to 300° C. Recommended concentrations are between about 0.0001 and 2.0 percent by weight. The compounds may be used in natural tobacco filler, reconstituted tobacco, or nontobacco substitutes, and may be applied using conventional methods.

86–0259. Sprecker, M.A.; Hanna, M.R.; Tokarzewski, R.J., et al. **Process for Preparing Mono-Oxomethyl Substituted Poly-**

hydrodimethanonaphthalene Derivatives. U.S. Patent No. 4,460,795, July 17, 1984, 57 pp.

Preparations are described for 36 derivatives of mono-oxomethyl-substituted polyhydrodimethanonaphthalene that can be used as aroma and flavor additives for tobacco. In chewing tobacco, the additives provide a cooling mint flavor. Five variants used in smoking tobaccos or in cigarette filters can produce sweet, floral, green, herbaceous, and cool minty aroma and taste in both mainstream and sidestream smoke; oriental spicy, cinnamon-like aroma and taste of a Turkish tobacco; and sweet, floral, and fruity Virginia-like tobacco aroma prior to and during smoking. The preparations can also be used as additives in foodstuffs, fragrances, detergents, fabric softeners, cosmetics, chewing gums, toothpastes, and medicinal products.

86–0260. Sprecker, M.A.; Hanna, M.R.; Tokarzewski, R.J., et al. **Mono-Oxomethyl Substituted Polyhydrodimethanonaphthalene Derivatives.** United States Patent No. 4,448,984, May 15, 1984, 57 pp.

The mono-oxomethyl substituted polyhydrodimethanonaphthalene derivatives described impart fresh, oriental, spicy, floral, and citrusy flavor and aroma nuances to tobacco products. As little as 0.001 percent by weight of the compounds may be used, but concentrations of 0.01 to 0.015 percent are recommended. Tobacco flavor profiles are given for eight of the compounds. Chromatographic profiles, NMR and wavelength spectra, and processes for synthesizing the compounds are given.

86–0261. Sprecker, M.A.; Hanna, M.R.; Tokarzewski, R.J., et al. **Mono-Oxomethyl Substituted Polyhydrodimethanonaphthalene Derivatives, Organoleptic Uses Thereof and Processes for Preparing Same.** United States Patent No. 4,476,042, October 9, 1984, 58 pp.

Mono-oxomethyl substituted polyhydrodimethanonaphthalene derivatives useful for flavoring tobacco products, and the process for their synthesis and isolation, are described. The various compounds impart sweet, floral, herbaceous, cinnamon, nutty, fruity, minty, spicy, Turkish-like, and Virginia-like notes to smoking tobacco products. Tobacco smoke flavor profiles for eight of the compounds are detailed. Flavor formulations for chewing tobacco are also provided.

86–0262. Sprecker, M.A.; Hanna, M.R.; Tokarzewski, R.J., et al. **Flavoring With Mono-Oxomethyl Substituted Polyhydrodimethanonaphthalene Derivatives.** United States Patent No. 4,470,963, September 11, 1984, 58 pp.

The mono-oxomethyl substituted polyhydrodimethanonaphthalene derivatives described have intense and long-lasting melony, cucumber, violet-like, green, leafy, herbaceous, wormwood-like, floral, cinnamic, sandalwood-like, patchouli-like, vetiver-like, sweaty, animalic, and spicy aroma and taste profiles that can be used to enhance the fragrance and flavor of chewing tobaccos, smoking tobaccos, smoking articles, and a variety of other products. The derivatives described can be obtained by reacting a bicyclopentadiene or dimethyl bicyclopentadiene with an acrolein derivative, at pressures ranging from 150 to 500 psi, at temperatures ranging from 150° to 250° C, and in the presence or absence of an inert solvent such as toluene or xylene. The reaction product is distilled, preferably by fractional distillation, and may then be used for its organoleptic properties or further reacted to form other derivatives. Gas—liquid chromatography profiles and nuclear magnetic resonance and infrared spectra for the derivatives are provided.

86–0263. Tokarzewski, R.J.; Schreiber, W.L. **Acetyl Dimethylbutylcyclohexene and Organoleptic Uses Therefor.** United States Patent No. 4,449,009, May 15, 1984, 14 pp.

The acetyl dimethylbutylcyclohexene compounds described are useful for augmenting or enhancing the aroma and/or taste of tobacco. The compounds provide fruity, hay-like, and woody aromas and tastes both prior to and on smoking in the mainstream and sidestream smoke. The derivatives may be prepared by reacting piperylene with 3-methyl-octene-3-one-2 by means of a Diels-alder reaction. The reaction may take place in the presence of a Lewis acid catalyst such as aluminum trichloride at lower temperatures (e.g., 0° to 50° C) or in the absence of a catalyst at higher temperatures (e.g., 40° to 100° C). The resulting product may be worked up according to standard extraction and distillation procedures and the isomers may be used in admixture or separated. The compound can also be use to augment or enhance the aroma of perfume compositions, perfumed articles, and colognes.

86–0264. Williams, D.L.; Southwick, E.W.; Houminer, Y. **Smoking Compositions Containing Acylpyrazine Ether Flavorants.** United States Patent No. 4,535,791, August 20, 1985, 7 pp.

Smoking compositions that contain between 0.00001 and 2.0 percent by weight of an acylpyrazine with an admixture of tobacco, reconstituted tobacco, or tobacco substitutes are described. Addition of the compounds to cigarette tobacco results in smoke flavor properties that are smoother, have a light sweet apple note, and slight burnt, phenolic, green-sour, fuller, dry-roasted, peanut husk, or green caramel nuances. Preparation of seven specific acylpyrazines is detailed. The compounds are incorporated into the tobacco in accordance with usual methods.

TOBACCO MANUFACTURING AND PROCESSING

86–0265. Browne, C.L.; Keith, C.H.; Bohlander, P.J. **Process for Preparing Compound Filter.** U.S. Patent No. 4,460,001, July 17, 1984, 13 pp.

A compound cigarette filter for tar reduction is described that contains an upstream section acting as a restrictive barrier abutting the next filter segment. The barrier, preferably a flat, concave, or convex wafer of a smoke-impervious material, or a smoke-impervious coating, has from three to five smoke-permeable passageways, the total cross-sectional area being from 1.9 to 2.5 mm^3. On smoking, tar buildup downstream of the barrier produces increased blockage that increases pressure drop and filtration efficiency, which results in substantially constant nicotine and tar delivery. The compound filter has an initial, totally encapsulated pressure drop of at least 90 mm H_2O. (Auth. Abs. Mod.)

86–0266. Cantrell, D.V.; Halverstadt, D.A. **Cigarette Having a Mouthpiece.** United States Patent No. 4,540,005, September 10, 1985, 8 pp.

In the cigarette mouthpiece described, which lowers tar levels in smoke exclusively by ventilation, an impermeable cylindrical plug is joined coaxially to the tobacco rod. The plug contains multiple smoke flow channels that deliver unfiltered smoke to a generally hollow cylindrical mouthpiece. There are multiple grooves on the peripheral surface of the plug that extend into the mouthpiece to deliver ventilating air. Smoke and air are thus mixed in the chamber(s) of the mouthpiece prior to entering the smoker's mouth. Alternatively, the grooves on the periphery of the plug may connect with matching grooves on the surface of the mouthpiece (or the grooves may be confined to the mouthpiece) to deliver ventilating air directly to the smoker. Air-permeable tipping paper joins the tobacco rod, the plug with smoke delivery channels, and the hollow mouthpiece.

86–0267. Caseley, J.R. **Filter for Reducing the Toxic Effects of Cigarette Tobacco Smoke.** U.S. Patent No. 4,532,947, August 6, 1985, 3 pp.

The filter described contains active components to remove mutagenic, carcinogenic, and cocarcinogenic compounds from cigarette smoke. Based on a general formula ($H\text{-}S\text{-}X\text{-}SO_3H$), the powdered ingredients are added to the filter to significantly decrease hydrocyanic acid and both saturated and unsaturated aldehydes, especially acrolein, formaldehyde, and acetaldehyde. According to laboratory and smoking tests, a milder and more agreeable smoke results. Increased absorption of toxic elements results with increasing amounts of additives, which are contained either in the cigarette filter or in a separate holder. (Auth. Abs. Mod.)

86–0268. Durocher, D.F. **The Influence of Paper Components on the Delivery of Low-Tar Cigarettes.** *Tabak Journal International* 3:186, 188-189, 194, June 1985.

The selection of paper cigarette components, including cigarette wrapper, tipping, and plug wrapper, and the effects of this selection on performance of low-tar cigarettes are reviewed. Target cigarette deliveries may be achieved by any of several combinations of tipping, plug wrap, and cigarette wrapper. In a vented filter cigarette, changing to a more porous cigarette wrapper will not increase the cigarette's total dilution to the same degree as would be expected in a cigarette without filter ventilation. This is because the lower draw resistance reduces the pressure drop across the filter vents, resulting in less dilution of the air flow into the filter tip. The majority of low-tar cigarettes are ventilated with ventilated tipping paper and plug wrap, which must be considered together, because this is the way the filter tip dilution air flow for the cigarette is determined. The most popular methods used to produce filter tip perforations are laser electrical spark discharge and mechanical means (34.3 and 21.8 percent, respectively, of filtered cigarettes). The choice is dictated by the level of dilution and degree of perforation visibility that is acceptable. Future trends are briefly discussed with emphasis on developing knowledge of the paper properties that are achievable and their impact on cigarette performance.

86–0269. Egri, L. **Method of Increasing the Volume of Cut Tobacco Ribs and an Apparatus for Carrying Out Said Method.** United States Patent No. 4,483,352, November 20, 1984, 9 pp.

The method described for increasing the volume of cut tobacco ribs involves impregnating the ribs with an expansion medium consisting of water, orthophosphoric acid, and/or sodium salts. When the ribs reach a water content of at least 45 percent by weight, the impregnated material is heated to a temperature of between 105° to 250° C in a gaseous heating and transport medium that contains at least 50 percent steam. The material is transported through an expansion and drying zone where it is kept for at least 10 seconds, and then dried to a final moisture content of at least 12.5 percent by weight. The tobacco is separated from the gaseous transport medium in a cyclone separator and subjected to further processing. The method may increase the filling power of the material up to 60 percent.

86–0270. Hausermann, M. **Filter Cigarette.** United State Patent No. 4,527,573, July 9, 1985, 7 pp.

The filter cigarette described adjusts to a wide range of air dilution values and is readily adaptable to a high rate of production on conventional cigarette-making machinery. It consists of a tobacco rod, wrapped (substantially cylindrical) filter plug, and air transmissive tipping paper. The filter plug includes a mouth-end segment and an axially aligned, abutting rod-end segment joined so that the first segment is rotatable about a common axis. The second segment abuts and is joined to the tobacco rod. The wrapping, which is substantially air permeable, has longitudinal air-impermeable depressions spaced about the circumference of the first segment. These are registered with corresponding longitudinal air-impermeable depressions spaced about the circumference of the second segment. As the first segment is rotated relative to the second segment, registry of depressions vary, thereby admitting varying amounts of air to the filter. (Auth. Abs. Mod.)

86–0271. Keritsis, G.D. **Process for Increasing and Maintaining the Filling Power of Tobacco.** U.S. Patent No. 4,532,945, August 6, 1985, 4 pp.

A process for increasing and maintaining the filling power of tobacco by applying a cross-linking agent is described. Moisture reduction during the curing process results in leaf shrinkage and decreased filling power. Shredding or cutting cured tobacco further laminates and compresses tobacco. The process increases the wet and dry strength of tobacco, particularly tobacco filler and reconstituted tobacco, and reduces breakage during normal processing. It also protects various fillers from collapsing or softening during smoking. The cross-linking agent is applied directly or in the form of a solution, preferably during tobacco expansion treatment. (Auth. Abs. Mod.)

86–0272. Keritsis, G.D.; Sun, H.H. **Process for Increasing the Filling Power of Tobacco Lamina Filler Having a Low Initial Moisture Content.** U.S. Patent No. 4,458,700, July 10, 1984, 8 pp.

A process is disclosed for increasing the filling power of tobacco lamina filler having an OV value of about 2 percent to about 7 percent, without use of exogenous impregnants. The filler is contacted by a high velocity gaseous medium of 65 percent steam by volume flowing 33 to 43 m/sec at temperatures between 288° and 360° C. The process is operated at one atmosphere enabling heat to be rapidly and uniformly transferred from medium to filler within 1 to 4 seconds optimum contact time, sufficient to stiffen and expand the filler. (Auth. Abs. Mod.)

86–0273. King, M. **Nontobacco Cigarettes. (Letter).** *Canadian Medical Association Journal* 133(1):13, July 1985.

Use of nontobacco products to lessen the health hazard of smoking may be more dangerous than smoking tobacco. "Jazz" (made in Argentina) was recently introduced in Canada as a cigarette containing no nicotine, thereby implying that it is safe. Analysis of Jazz indicates a tar content of 5 mg/cigarette, a level between so-called "extra light" and nonfilter conventional cigarettes. Nontobacco cigarettes generate carbon monoxide and some (judging by odor) undoubtedly contain substantial concentrations of irritant gases. Since nicotine is the least harmful of the noxious agents in cigarette smoke, the use of nontobacco cigarettes provides no significant benefit. Not subject to government controls, nontobacco products carry no warning labels, are advertised freely, and are taxed less heavily. Governmental health agencies should recognize the hazards of nontobacco products and regulate them accordingly.

86–0274. Luke, J.A. **Tobacco Smoke Filters.** United States Patent No. 4,527,572, July 9, 1985, 4 pp.

The improved cigarette filter described enhances the character of smoke and cools mainstream smoke. The smoke filter has helically extending peripheral airflow grooves of variable depth between a shallow inlet end and a deep outlet end. The face of the outlet end is more permeable to air than are the floor and sides of each groove. Tipping enwrapping the filter plug has ventilation perforations at the inlet end of each groove. When the cigarette is smoked, a first stream of ventilation air enters the body of the filter plug from peripheral grooves. By swirling motion imposed on it by design, air is mixed with tobacco smoke. Another stream of ventilation air that is substantially unmixed with tobacco smoke enters the smoker's mouth from the grooves. (Auth. Abs. Mod.)

86–0275. Luke, J.A. **Smoking Article Filters.** United States Patent No. 4,535,793, August 20, 1985, 5 pp.

The manufacturing process described produces a cigarette filter that delivers both filtered tobacco smoke and ventilating air to the smoker, and does not require a sealant in its construction. The filter material and plug wrap are fed continuously into a rod maker, which brings the rod into contact with a heated means of molding ventilating indentations into the surface of the rod while preserving the continuity of the plug wrap. The plug wrap, which is composed (preferably) of 45 to 95 percent of a thermoplastically moldable material, is reduced in thickness, has a low order of smoke permeability, and provides a continuous lining on the peripheral surface of the filter plug. The heat-molded ventilating grooves extend longitudinally from the mouth, stopping short of joining the tobacco rod. The filter is then enclosed in an air-permeable wrapper to provide ventilation.

86–0276. Nichols, W.A.; Newsome, R.W. **Adjustable Filter Cigarette.** U.S. Patent No. 4,532,943, August 6, 1985, 11 pp.

A filter cigarette that can be adjusted by the smoker to vary air dilution, resistance-to-draw, and flavor is described. It is comprised of a tobacco rod wrapped in cigarette paper, an integral axially aligned cylindrical filter plug, and tipping paper. The filter plug is divided into two segments. Rotation of the first segment with respect to the second segment serves to vary air dilution and produces variable resistance-to-draw.

These two features produce a cigarette that maintains a constant resistance-to-draw as air dilution is varied. In another mode, an encapsulated flavorant is released in response to rotation of the first segment. A variety of combinations can be produced based on the three features. (Auth. Abs. Mod.)

86–0277. Seatts, W. **Self-Extinguishing Cigar or Cigarette.** United States Patent No. 4,436,101, March 13, 1984, 6 pp.

The filter of the self-extinguishing cigarette described contains a compressible vessel with a wax-plugged spout extending into the tobacco portion of the cigarette. The vessel contains substances that, when the filter is compressed by the teeth or is stepped on, will eject the wax plug, wetting and extinguishing the cigarette. The contents of the vessel may include (1) a heat-activated fire extinguishing substance; (2) liquids that will respond only to externally applied force; or (3) heat decomposable material that includes as a decomposition product a nontoxic gas that will serve as a propellant to drive the fire-extinguishing portion of the contents into the burning tobacco.

86–0278. Sensabaugh, A.J., Jr.; Parks, R.L.; Marsh, C., Jr. **Process for Producing Moist Snuff.** United States Patent No. 4,528,993, July 16, 1985, 5 pp.

A process for producing moist snuff that differs radically from conventional processes is described. Tobacco is hogshead aged for only 2 years. Instead of producing snuff taste characteristics through fermentation, tobacco is cased, and chemical reactions, including Maillard reactions, are induced to produce snuff flavor precursors. (Auth. Abs. Mod.)

86–0279. Weinert, F. **Coated Self-Extinguished Cigarette.** United States Patent No. 4,480,650, November 6, 1984, 3 pp.

The cigarette paper coating described will eliminate fire hazards and reduce levels of carbon monoxide and other components of cigarette smoke. A clay/ceramic coating is applied to the inside of the cigarette paper, forming a fireproof shell that hardens, brittles, and chips off the cigarette as the glowing tobacco moves further inward. Alternatively, the coating may be divided into annular units to flip off after the glowing end has receded beyond a section. The heat of the burning tobacco brittles the coating enough to allow air to penetrate but prevents the burning tobacco from being exposed to outer surfaces. In addition to eliminating fire hazards, the coating prevents the cigarette paper from burning, reducing the smoke content of carbon monoxide and other toxic gases that originate in the cigarette paper. A sleeve or collar of coating around the mouth end of the cigarette is also recommended to conceal the burning end of a discarded butt.

86–0280. White, J.L. **Smoking Product.** U.S. Patent No. 4,534,372, August 13, 1985, 5 pp.

Using the method described for imparting color to tobacco substitutes, finely divided, toasted cereal grain, such as milo, corn, and rice are applied to the surface of smokeable materials or incorporated into a slurry that is shaped into desired form. By employing the grains as coloring agents, it is possible to vary the degree of color by controlling the color developed during the toasting process. Being combustible materials, the grains are well suited for use as tobacco substitutes. (Auth. Abs. Mod.)

86–0281. White, J.L. **Smoking Product.** U.S. Patent No. 4,534,371, August 13, 1985, 4 pp.

A tobacco-like color is imparted to smokeable materials by applying finely divided vermiculite to the surface of the materials or by incorporating the vermiculite into a slurry of materials that is subsequently shaped into desired form. By employing vermiculite as the coloring agent, it is possible to vary the degree of color imparted to the materials by controlling the color developed by the vermiculite during heat treatment. The vermiculite is also capable of effecting desirable changes in the composition of the smoke that passes into the mouth of the smoker. (Auth. Abs. Mod.)

86–0282. White, J.L.; Conrad, L.J. **Process for Increasing Filling Capacity of Tobacco.** United States Patent No. 4,531,529, July 30, 1985, 6 pp.

The improved process described for increasing the filling capacity of tobacco is especially suitable for reducing the bulk density of cigarette cut filler. The process involves contacting tobacco with vapors of an expansion agent at elevated temperature and pressure conditions, then releasing the pressure in a relatively short time period to a level approximating atmospheric pressure. This sudden release of pressure expands the tobacco, thereby increasing its filling capacity without the subsequent heating step previously required. The process can be applied to cured tobacco in the form of leaf, strips, or cigarette cut filler. Filler is preferred because the process is more effective with smaller particle sizes, and because some of the increase in filling capacity achieved when using leaf or strips would be lost during subsequent cutting and shredding operations. Preferred expansion agents are low-boiling, highly volatile compounds that have critical temperatures ranging from 30° to 155° C. Suitable agents include ethane, propane, propylene, n-butane, isobutane, and several halogenated hydrocarbons.

TOBACCO ECONOMICS

86–0283. Ahmad, M. **Pakistan. Poor 1984 Quality; Large 1985 Quantity Not Easily Assessed.** *Tobacco International* 187(14):5, 7-10, July 12, 1985.

The 1984 tobacco crop in Pakistan was incorrectly assessed as a small crop, resulting in panic among buyers and improper grading and curing by growers. Losses to the cigarette manufacturers were high. Of 25 cigarette manufacturing units, 5 were fully or partly inoperative during the year. However, those that functioned produced a total of 40.6 billion cigarettes, a 5.0 percent increase over 1983. Exports of cigarettes rose 46 percent over 1983, to a record of 1.92 billion. Also, 16 new brands were introduced, most in low-price categories, but only 2 have achieved successful market shares. Demand for filtered brands grew 12 percent, accounting for 60.3 percent of sales in 1984. However, cigarette production is currently at only 62 percent of capacity. Power shutdowns, low profits, high taxes, inflation, and mandatory price increases for raw tobacco make improvements in efficiency difficult. On the other hand, crop yields and quality are being constantly improved (1984 yields were 2,000 kg/ha compared with 1,180 kg/ha in 1973), and manufacturers have requested 22 percent more air-cured Virginia, 3 percent more flue-cured Virginia, 44 percent more burley, and 29 percent less rustica. Although growers fear that the current unavailability of specific fertilizer may adversely affect 1985 yields, current market indications predict a surplus high-quality crop in 1985.

86–0284. Jacobson, B.; Amos, A. **When Smoke Gets in Your Eyes. Cigarette Advertising Policy and Coverage of Smoking and Health in Women's Magazines.** Professional Division, British Medical Association. London, BMA Imprint, May 1985, 36 pp.

According to a British Medical Association (BMA) survey, cigarette advertising is accepted by 64 percent of women's magazines, including those aimed at young female readers. Evidence implicating the tobacco industry in breach of its voluntary agreement with the Government to protect young nonsmokers and experimental smokers from cigarette advertising is presented. Fifty-three magazines with predominantly female readership were surveyed (August 1984 to February 1985). Editors were asked for (1) the most recent article on smoking and health published in the magazine; (2) size and age range of target readership; (3) magazine's policy on cigarette advertising and proportion of total revenue coming from cigarette advertising; and (4) editor's view on cigarette advertising directed at women. Responses were received from 87 percent; 8 of the 10 who did not respond were known to accept cigarette advertising. While 32 percent flatly refused, 64 percent accepted advertisments from all brands to conditionary low-to-middle tar brands. Reasons for acceptance included (1) advertising is an important source of revenue; (2) magazine declined censoring role; (3) copy was approved by Advertising Standards Authority (ASA); and (4) copy included health warning. Some acknowledged that advertising was accepted reluctantly.

86–0285. Keenan, E. **Smoking and Its Promotion in Greece. A 20th Century Trojan Horse.** *New York State Journal of Medicine* 85(7):409-412, July 1985.

The Greek tobacco industry is one of the most productive sectors of the economy; tobacco is the main source of income for about 100,000 families, and more than 500,000 people (6 percent of the population) are dependent on income derived from tobacco production and handling. The Government assists tobacco producers by fixing support prices for each crop, providing loans to enable growers to modernize production methods, and subsidizing growers' incomes to encourage cultivation of commercially desirable varieties. Greece exports about 80 percent of the tobacco crop each year, much of it to the United States. In 1983, exports earned 198 million dollars in foreign exchange. The remainder supplied more than 90 percent of domestic demand. Government taxes on cigarettes in 1983 totalled 345 million dollars (about 5 percent of the national budget revenue). In 1983, 26.6 billion cigarettes were smoked (roughly 10 cigarettes/day for every person over 15 years of age). Cigarette consumption has increased 50 percent during the last decade. Women and schoolchildren are taking up the habit in growing numbers. The Government's record in dealing with the cigarette epidemic is poor, and efforts to enact antismoking legislation have not been successful.

86–0286. Kjonstad, A. **An Attempt to Circumvent the Ban on Cigarette Advertising in Norway.** *New York State Journal of Medicine* 85(7):403-404, July 1985.

Advertising designed to retain an association with a particular brand of cigarettes long after the product has been removed is an infringement of the Norwegian Tobacco Act. The ban on advertising of tobacco products, enacted in 1973, virtually removed all cigarette advertising from newspapers and magazines, and ended television commercials and outdoor advertising, including posters, signs, neon lights, and shop displays. A celebrated attempt by the tobacco industry to circumvent the ban is documented. The campaign was initiated with a magazine cigarette ad (Camel) that was a clear breach of the ban. Identical ads later substituted outdoor boots for the tobacco product, but maintained tobacco product imagery including the brand name in its distinctive lettering. The fourth and final ad in the campaign, retaining the name of the tobacco product (although lettering was changed) and the original outdoorsman, was totally innocent in appearance. Construed legally as an attempt to circumvent the ban, the entire series of ads were judged to be in violation because "a chain of associations is maintained to the ad for tobacco products." R.J. Reynolds, makers of Camel cigarettes, admitted to the marketing ploy. It was also revealed that the name Camel could not have been used without consent of the manufacturer.

86–0287. La Vecchia, C. **Indirect Cigarette Advertising in Italy. (Letter).** *Lancet* 2(8447):159, July 20, 1985.

Cigarette advertising is prohibited in Italy, and although direct promotion has almost disappeared, many other commercial activities (clothing, music, travel) are now advertised under cigarette trademarks. Issues of the seven prominent general magazines and three major women's magazines screened carried between 0 and 42 such advertisements in 1984. A single issue of Italy's major weekly had seven pages of advertisements featuring a tobacco manufacturer's trademark. Similar promotions are shown on television. The media provide little coverage of smoking and health, while overt misinformation is common, which contributes to the low level of awareness of the risks of smoking. The tobacco industry's efforts to circumvent the ban underscore the importance of advertising to cigarette manufacturers.

86–0288. Nares, P. **Despite Smuggled Brands, Sales of Colombian Cigarettes Rise.** *Tobacco International* 187(13):47-48, June 28, 1985.

In response to pleas from the tobacco industry, the Colombian Government is expected to intensify its efforts this year to suppress trade in contraband American cigarettes, which are estimated to have captured over a third of the domestic market. A brisk demand for the bootlegged tobacco exists because the legal importation of foreign cigarettes and cigars has been prohibited as part of governmental import restrictions introduced to head off a balance of payments crisis. Despite the smuggling, sales of most domestic cigarettes have been rising as a result of the import restrictions on foreign brands and, to a lesser extent, reactivation of the economy. The Government has also announced that a Tobacco Fund will be created to aid troubled black-leaf producers. These growers have been sorely affected this year by a slump in demand for their crop. Stockpiles of black tobacco have increased, and planters, unable to market their produce rapidly, have experienced serious financial difficulties. Domestic demand for black leaf is expected to continue decreasing. It has been suggested that Colombian blonde-leaf cigarette prices be increased to help alleviate this problem; however, any major price increases would be expected to further stimulate sales of similar brands smuggled in from the United States.

86–0289. New York State Journal of Medicine. **Obstacles to the Prevention of Teenage Smoking. A Dialogue With Joseph A. Califano, Jr.** *New York State Journal of Medicine* 85(7):360-362, July 1985.

Tobacco industry lobbying power and its political implications are discussed by former Health, Education, and Welfare Secretary Joseph A. Califano, Jr. The only HEW secretary to propose antismoking campaigns, Califano condemns cigarette advertising that makes smoking a glamorous activity for adolescents. Most adults who are addicted became so before the age of 21. With a budget of less than 10 million dollars to counteract tobacco advertising (estimated at 1.5 billion dollars annually), HEW under Califano attempted to reach adolescents through educational materials for use in classrooms. The tobacco industry did not object to monies spent on research, but fought against all efforts to educate young people about the dangers of smoking. The classroom, with a tradition of teaching health and hygiene, is the one place where adolescents can learn of the hazards associated with use of cigarettes, drugs, and alcohol. Despite reports that smoking in the United States is declining, the number of adolescents and young adult women who smoke is increasing. Research is needed to find the most effective methods for assisting smokers to quit.

86–0290. Richards, J.W., Jr.; Blum, A. **Pharmacists Who Dispense Cigarettes. With Reference to Drug Store Chains and Pharmaceutical Companies.** *New York State Journal of Medicine* 85(7):350-353, July 1985.

Twenty-five percent of cigarette purchases are made in pharmacies. Eight percent of chain drugstore profits (and 6.2 percent of all drugstore purchases) are derived from cigarette sales, ranking fourth among all products sold in pharmacies. Although overall tobacco sales have declined, chain drugstore sales of tobacco products increased 9 percent in 1984 to nearly 2 billion dollars. Marketing strategies of tobacco companies for pharmacy sales are meticulously planned and implemented. Tobacco salesmen provide pharmacists with monetary rewards in exchange for prominent display of tobacco products at checkout counters. Misgivings about aiding the perpetuation of tobacco use were tested in a San Francisco survey of 100 retail pharmacies. Only 11 did not sell cigarettes. It is suggested that physicians, by supporting only those pharmacists who make a commitment to health promotion, could effect a policy change in their stores. Certain pharmaceutical manufacturers also have direct ties with the tobacco industry, advertising drugs in tobacco journals, serving on tobacco advisory boards, and supplying pesticides for tobacco growers and chemical additives for cigarette manufacture.

86–0291. Scally, G.J. **Economic Dependence on Tobacco Manufacturing in Northern Ireland. An Obstacle to Prevention.** *New York State Journal of Medicine* 85(7):396-399, July 1985.

Northern Ireland has a smoking problem in common with the rest of the world; 33 percent of the population are smokers and more than 2,000 deaths annually are attributed to smoking. Recession has hit areas already economically weak, and unemployment (21.9 percent in September 1984) approaches twice that of Great Britain. Against this bleak background, the tobacco industry occupies a prominent position in the economy. The number of people employed in the tobacco industry is more than twice that of its nearest rival (the Netherlands). A leading recipient of governmental assistance, the tobacco industry was granted 3.2 million dollars in aid in 1982 to 1983. Government spending on health education during the same period totalled approximately 600,000 dollars. Tobacco industry sponsorship of sports and cultural events has been interpreted as a belated attempt to buy respectability. Antismoking activity is not regarded as a priority among health professionals. An increased tax on cigarettes was fought off by the tobacco industry, which made much of the threat to jobs. It is suggested that an alternative employment strategy be constructed to effectively respond to the tobacco company's argument that to prevent 2,000 deaths annually, 5,000 jobs would have to be sacrificed.

86–0292. Tabak Journal International. **Statistics. Export—Import of Cigarettes for Selected Countries in Million Pieces.** *Tabak Journal International* 3:246, 248-249, June 1985.

Cigarette export—import statistics are presented for 131 countries worldwide for the period from 1975 to 1979 and for 1980, 1981, 1982, and 1983. The leading importers (million pieces/year) were Saudi Arabia, 11,500 (Asia); Colombia, 900 (South America); Haiti, 1,000 (North America); Egypt, 2,050 (Africa); Russia, 60,000 (Europe); and Australia, 650 (Oceania), contributing to a worldwide total of 247,480 million pieces. The leading cigarette exporting countries in 1983 were, respectively, Hong Kong (7,871), Colombia (300) and Ecuador (300), United States (60,698), Senegal (500), Bulgaria (77,050), and Australia (324), contributing to a worldwide total of 348,749 million pieces.

86–0293. Thassitis, B. **Dynamic Activity of the Greek Cigarette Industry.** *Tabak Journal International* 3:196, 198, June 1985.

Cigarette sales in Greece increased from 26.6 thousand million pieces in 1983 to 28.2 thousand million pieces in 1984. The 6.6 percent increase in consumption of domestic products (national brands and those produced under license) was mainly in filter cigarettes, which increased from 23.362 million pieces in 1983 to 24.966 million in 1984 (6.8 percent). The much smaller increase in consumption of plain cigarettes, from 1.975 million pieces in 1983 to 2.053 million in 1984, followed a constant decline over many years. Greek cigarette manufacturers increased both production and sales in 1984. Market shares in 1984 compared with 1983 were Papastratas, 41.3 percent vs. 43.5 percent; Karelias, 29.1 percent vs. 27.7 percent; Keranis, 14.2 percent vs. 14.5 percent; Georgiades, 8.1 percent vs. 8.4 percent; SEKAP, 5.1 percent vs. 3.7 percent; and Constantinou, 2.3 percent vs. 2.2 percent. Blended cigarette brands showed large sales increases; sales of the "Light Filter" brand doubled (from 902 to 1,801 million pieces). The success or failure of individual brands is determined to a great extent by recent price increases, which affect foreign brands more than domestics, and higher taxes. The average tax burden in 1984 was 59.8 percent of the retail price for local brands and 57.9 percent of the retail price for imported brands.

86–0294. Tobacco International. **South African Tobacco Production: Home Market Stressed.** *Tobacco International* 187(11):36-38,41, May 1985.

By 1983, the tobacco industry in South Africa employed 70,000 people and contributed approximately one-half billion dollars to the economy on a capital investment of twice that amount. In recent years, yields of 27 to 28 million kilograms of tobacco have been produced annually. Of the total, 70 percent is flue-cured, 18 percent air-cured, 10 percent burley, and the remaining oriental. Approximately two-thirds is used for cigarettes and one-third for pipe tobacco; the remainder is used for snuff, roll tobacco, cigars, and cigarillos. Between 1978 and 1983, overall tobacco consumption increased. Cigarette sales rose 7.4 percent, pipe tobacco use dropped 5.1 percent, and use of other tobacco products declined 0.5 percent. However, the trend was reversed in 1983-1984. Cigarette sales declined 3.2 percent while there were increases for pipe tobacco (7.8 percent), snuff (12.8 percent), and roll tobacco (7.7 percent). The changes in buying patterns are attributed to drought and subsequent economic decline among nonwhite smokers, who account for 75 percent of total sales. Although the price of tobacco has more than doubled since 1978, price increases have not been as high as those of other consumer products, and tobacco's share of total consumer spending has decreased.

86–0295. Tye, J.B. **Cigarette Marketing: Ethical Conservatism or Corporate Violence?** *New York State Journal of Medicine* 85(7):324-327, July 1985.

The most effective way to induce cigarette companies and their advertising agencies to behave in an ethically conservative manner is to make them legally responsible for failure to adopt acceptable marketing practices. Cigarettes are one of the least regulated, most promoted, and most profitable products on the market, despite substantial evidence linking cigarette smoking with many debilitating and often lethal diseases. A free enterprise society can flourish only when business voluntarily adopts measures to protect the public. A proposed Standard of Ethical Conservatism for cigarette marketing would (1) warn consumers of any potential risks; (2) prevent advertising and promotional activities from influencing people particularly susceptible to cigarette advertising imagery; and (3) prevent the exploitation of new markets. Marketing practices of cigarette companies are so pernicious that, by subordinating concern for human safety to monetary considerations, they constitute corporate violence. Although a growing number of businesses are acknowledging the health hazards of smoking, the overall business community has been willing to support and even profit from the sale of cigarettes, particularly advertising agencies and the business press. Unwillingness by the cigarette industry to adhere to a Standard of Ethical Conservatism and the lack of governmental action leaves society as a whole with only one recourse: litigation.

See also, **86–0298**

LEGISLATION

86–0296. Blondal, T.; Magnusson, G. **Innovation in Iceland: Graphic Health Warnings on Tobacco Products.** *New York State Journal of Medicine* 85(7):405-406, July 1985.

Unique pictorial warnings on tobacco products, designed to convey health information to Iceland's 70,000 smokers, are strengthening the nation's efforts to reduce the annual death toll among smokers and to protect nonsmokers. The Icelandic Tobacco Act (passed unanimously) specifies that (1) all packs of cigarettes, cigars, pipe tobacco, and snuff must carry a health warning; (2) tobacco cannot be sold to anyone under 16 years of age; and (3) smoking is illegal in public areas of government buildings, institutions, and businesses. Tobacco ads were banned in 1971. Eight warnings, each in a different color, are readable and are difficult to obscure. The cost of warning labels is paid by tobacco manufacturers, who are not permitted to place the warnings on transparent foil or other outer wrappings. Warning messages are (1) Smoking during pregnancy endangers health of mother and child; (2) Smoking may damage arteries and cause heart attack; (3) Protect children from tobacco smoke; (4) If you stop smoking you improve your health and increase your life expectancy; (5) Smoking is a health problem you can help to solve; (6) Hundreds of Icelanders die each year from smoking; (7) Tobacco smoke pollutes air and is a health hazard; and (8) Snuff and chewing tobacco may damage mucous membranes.

86–0297. Chapman, S. **Competing Agenda in Smoking Control Agencies. "Those Who Pay the Piper . . ."** *New York State Journal of Medicine* 85(7):287-289, July 1985.

Smoking control, with the decline and eventual elimination of tobacco smoking as its main objective, strikes at the very heart of the world's largest and most powerful industry. Advocates in the fight are the enemies of the tobacco industry and political interests that reject the intrusion of the state into free marketing between producers and consumers. Actions by governments that spawn programs that are piecemeal, cosmetic, and ineffective are classified as popular prevention. Unpopular prevention is policy oriented, aimed at social, economic, and political structures that contribute to widespread smoking and to the economic health of the tobacco industry. In working toward changing public and political opinion in favor of an advertising ban, for example, unpopular prevention requires adoption of the opportunistic, responsive, imaginative, flexible, newsworthy, dramatic, and mythologizing tactics of successful public opinion, political, and commercial campaigns. Many health charities have chosen to fund research and development and have failed to confront the tobacco industry or conservative governments on manifest or latent protobacco industry policies. Damning evidence about smoking's effects on health unearthed through academic research is often buried in obscure academic publications. Big waves must be made in the big ponds of public opinion and political action, and the smoking issue must be politicized to the point that government is embarrassed if it does not act against the tobacco industry.

86–0298. Chwat, R. **Congressman Rose on 2-Cent Tax, 95 Percent U.S. Leaf in Domestic Products.** *Tobacco International,* pp. 13-14 June 1985.

The tobacco issue of 1985 is the future of the price support program. Antitobacco groups in the U.S. want to do away with tobacco price support completely; health groups are more interested in excise taxes and domestic content. Tobacco growers are concerned about large stocks, resulting from increased tobacco imports by U.S. companies, while domestic production has been displaced into stabilization by the strong dollar. A price reduction of flue-cured and burley price support levels is needed; burley producers also need legislative relief from the 1983 crop burden. On behalf of the tobacco growers, a 2-cent excise tax increase is being proposed to clean out surpluses. Despite being uncooperative, tobacco companies realized hefty profits through increased cigarette prices following the previous 8-cent increase in the excise tax. The 2-cent excise tax increase will be controlled by tobacco surplus levels; if stabilization stocks fall to half, the tax will be reduced by half. New legislation (1986) will probably propose that U.S. cigarettes contain at least 95 percent (up from 60 percent) American-grown tobacco, similar to policies of Australia and most South American companies. This would also reduce the pesticide risk by keeping exposed tobacco out of the United States.

86–0299. Hanauer, P. **Proposition P: Anatomy of a Nonsmokers' Rights Ordinance.** *New York State Journal of Medicine* 85(7):369-374, July 1985.

On November 8, 1983, voters in San Francisco passed "Proposition P," a referendum on the city's workplace smoking ordinance enacted by the Board of Supervisors. The vote marked the first time that the tobacco industry, which had consistently opposed all laws regulating public smoking, had been defeated. San Franciscans had approved what was then the strongest workplace smoking law in the country. The ordinance requires all public and private office workplaces to have policies on smoking that seek to accommodate the needs of smokers and nonsmokers. It requires that notice of the policies be given to employees and that appropriate signs be posted. The law is enforced by the city's health department, and civil penalties are imposed on employers who fail to establish reasonable policies. Despite expensive efforts by the cigarette companies, Proposition P passed. The successful outcome is attributed to a resourceful group of nonsmokers' rights advocates who studied the opponent's strategy and outmaneuvered each antiproposition tactic. An anatomy of the campaign is provided that outlines the basic issues to be faced in communities contemplating similar workplace smoking ordinances.

86–0300. Herman, M.A. **New Jersey's Hard-Fought Battle for Clean Indoor Air Legislation. An Insider's View.** *New York State Journal of Medicine* 85(7):366-368, July 1985.

The strategy employed by the tobacco industry in New Jersey's legislative battle for clean indoor air is documented. On December 3, 1981, three bills prohibiting smoking in elevators and schools and limiting smoking in hospitals and physicians' offices were signed into law. Measures limiting smoking in the workplace, restaurants, and public places, however, were defeated by efforts of the tobacco industry, unions, and the business community. A similar defeat occurred in the 1982 and 1983 sessions. New tactics were planned for the 1984 session, and a coalition was formed of groups formerly acting independently: Group Against Smoking Pollution (GASP), New Jersey divisions of American Cancer Society and the American Lung Association, and the New Jersey Medical Society. Additional support was obtained from the New Jersey Federation of Senior Citizens and the state Parent Teachers Association. A major breakthrough occurred when former opponents (the Communication Workers of America and the Business and Industry Association) sympathized with the legislation's goals and entered into further discussion, depriving the tobacco industry of New Jersey's two most influential lobby groups. Personal lobbying of legislators prior to the final vote in the Senate promised the necessary majority for passage. Now standing alone, the tobacco industry devised clever abstention strategy. Despite formidable opposition, the industry successfully defeated two of six bills (by only four votes) and thereby avoided the appearance of total defeat.

86–0301. Sweda, E.L., Jr. **Local Values Versus Tobacco Industry Power. The Experience of GASP of Massachusetts.** *New York State Journal of Medicine* 85(7):375-377, July 1985.

GASP (Group Against Smoking Pollution) of Massachusetts has grown from a fledgling discussion group of nonsmokers to a powerful catalyst for antismoking legislative and judicial activity. Efforts by GASP to push clean indoor air legislation and strategies by the tobacco industry to foil such grassroot movements are documented. GASP has been influential in ending street corner pushing of free cigarette samples, an 81.5 million dollar investment by the tobacco industry in 1981, according to the Federal Trade Commission. GASP lobbied that such sampling campaigns provide children with easy access to cigarettes and put the product in a socially acceptable light on public streets. Protecting nonsmokers' rights in the workplace, another GASP issue, resulted in a law (the first of its kind in Massachusetts) that requires employers with two or more workers to develop and post a smoking policy. GASP has also confronted the tobacco industry in the courtroom. In *Lee vs. Department of Public Welfare*, a social worker sued her employer for injunctive relief against tobacco smoke in her workplace. In a decision that serves as a major precedent for Massachusetts, the Superior court ruled in favor of the plaintiff.

86–0302. Waxman, H.A. **The Comprehensive Smoking Education Act.** *New York State Journal of Medicine* 85(7):363-365, July 1985.

Public health advocates won a major victory in the closing days of the 98th Congress with passage of Public Law 98-474, the Comprehensive Smoking Education Act. The following four new and bigger labels will replace the familiar 14-year-old Surgeon General's health warning on cigarette packs: (1) Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy; (2) Quitting Smoking Now Greatly Reduces Serious Risks to Your Health; (3) Smoking By Pregnant Women May Result in Fetal Injury, Premature Birth, and Low Birth Weight; and (4) Cigarette Smoke Contains Carbon Monoxide. In addition, the legislation requires that tobacco manufacturers disclose chemical ingredients added to cigarettes. Finally, it establishes a permanent statutory requirement that the Secretary of Health and Human Services inform the public of adverse health effects of smoking. Events that led to the new cigarette labeling law and brought the cigarette industry to the bargaining table are reviewed. Industry fears of product liability and reference to the addictive nature of smoking (deleted in the new law) are discussed. Tactics by the tobacco lobby to scuttle the legislation, sophisticated tobacco company marketing strategies, and their effectiveness in overwhelming public concern over the adverse effects of smoking are also addressed.

GENERAL

86–0303. Barrus, W.R. **Smokers', Nonsmokers' Rights Collide in the Work Environment.** *Occupational Health and Safety* 54(2):31-33, February 1985.

Smoking in the workplace affects health, profits, morale, employee satisfaction, and the rights of employee and employer. Many employers are afraid of a backlash if they attempt to enforce a no smoking policy in hiring practices, or impose the policy in long established work settings. Costs for implementing programs are also a factor. Many organizations are implementing an inexpensive employer-sponsored program encouraging and counseling employees on methods for quitting smoking. It is recommended that if a change is made, policy should be reviewed periodically and adjusted if necessary. Persons affected should be given the opportunity to express their views. Current statistics are helpful in justifying any adjustments in the program and in easing concerns of those affected by policy changes.

86–0304. Blum, A. **If Smoking Killed Baby Seals . . .** *New York State Journal of Medicine* 85(7):282-285, July 1985.

Worldwide dissemination of a photograph depicting a baby seal dying from a cigarette-related disease would undoubtedly attract massive support for efforts to end smoking. A flood of protest was sparked in 1975 by a newspaper photograph of beagle puppies strapped into a smoking machine. Strong public reaction will be required for success in reducing and/or eliminating smoking. Actions will entail anticipating the tactics of the tobacco industry rather than reacting to such tactics. Just as a parasite must be studied before it is attacked, so must preparations be made to tackle smoking i.e., by reading annual corporate reports, marketing surveys, and other resources used by the tobacco industry. Physician activism, such as participation in the legislative process through annual rallies and vigils at the offices of legislators (local, state, and Federal levels) in support of key bills aimed at curtailing smoking, could well begin to dilute the efforts of the smoking lobby and to educate legislators on the smoking issue. Boycotts by health professionals of tobacco company products and of companies that aid the tobacco industry are also suggested.

86–0305. Blum, A. (Editor). **The World Cigarette Pandemic. Part II.** *New York State Journal of Medicine* 85(7):278-477, July 1985.

The objective of this issue of the *New York State Journal of Medicine*, which is devoted to the world tobacco problem, was to go beyond the well-known medical consequences of smoking and provide a discussion of the ethical, social, political, economic, agricultural, religious, and legal aspects of smoking. The issue covers strategies for combating cigarette use, smoking and medical education, economics, toxicology of modern cigarettes, tobacco industry product liability, role models and other factors in advertising, legislation, therapeutics in smoking cessation, indoor air quality issues, and international trends in the smoking pandemic (Japan, Papua New Guinea, New Zealand, Great Britain, the Netherlands, Norway, Ireland, Iceland, France, Greece, the Soviet Union, and Israel). Also featured are a tribute to Luther Terry, an organizational review of the tobacco industry, a dialogue with Joseph A. Califano, Jr., and a case report of a benign lung tumor caused by a cigarette filter embedded in the lung.

86–0306. Coombes, W.N. **Statements on Smoking. (Letter).** *South African Medical Journal* 67(18): 708, May 4, 1985.

Smoking has been part of civilization since earliest records and for society to try to legislate for the health of the minority is considered rank impertinence. To issue a statement on smoking is to join the dogooders and dangerous minority groups for the sake of extending the lives of a few who will probably die from some other form of disease, even obesity caused by giving up smoking. One hundred thirty-four people were killed (in traffic accidents) over the Easter weekend. The number is just a statistical fact, and the only real significance is that South African roads are inadequate for traffic loads over holiday periods. Energy devoted toward interfering with people's lifestyles would be better expended on teaching defensive driving, which would be a positive step toward reducing road accidents.

86–0307. Cowell, M.J. **An Insurance Company Perspective on Smoking.** *New York State Journal of Medicine* 85(7):307-309, July 1985.

In April 1964, within 3 months of the publication of the first Surgeon General's report on smoking and health, the State Mutual Life Assurance Company took what was then considered a bold step in the insurance business. The company equated a person's smoking habit as an insurance risk and introduced a special life insurance policy for nonsmokers. The action was based on the belief that nonsmokers should not have to subsidize insurance costs resulting from the excess mortality among cigarette smokers. Statistical evidence convinced the insurance company that smokers had higher death rates and that the company could no longer ignore it in pricing insurance. Key implications of incorporating smoking risk in insurance underwriting, principal findings from State Mutual's and other companies' experience, and changes that the company's efforts brought about in the awareness of the risks of smoking are discussed.

86–0308. Downing, J.W. **Hazards of Smoking. (Letter).** *South African Medical Journal* 67(13):483, March 1985.

The Medical Association of South Africa is being questioned as to its stand against the "evils of tobacco," in light of recently declared opposition to cigarette advertising by the British Medical Association (BMA). Many actions planned by the BMA, such as outlawing sports sponsorship of televised events by tobacco companies, meeting with editors of magazines that carry tobacco advertising, campaigning for health warnings on cigarette packets, and enlisting help of physicians, are applicable to South Africa. Cigarette advertising in cinemas and on the radio must be stopped and a counteradvertising campaign mounted. Horror of lung cancer, living death of emphysema and chronic obstructive airways disease, and damage to cardiovascular systems await South African children exposed to subtle, but professionally executed, lies perpetrated by tobacco companies. The black population of South Africa, it is suggested, has become a prime target of the tobacco industry, and unless action is taken now, the medical profession will be faced with an epidemic of tobacco-related diseases.

86–0309. Edell, M.Z.; Gisser, S.M. *Cipollone v Liggett Group, Inc.* The Application of Theories of Liability in Current Cigarette Litigation. *New York State Journal of Medicine* 85(7):318-321, July 1985.

Application of liability theories in current cigarette litigation is discussed. Liggett Group, Inc., and others are defending lawsuits brought by individuals suffering or dying from lung cancer and other cigarette-related diseases. The claims and defenses espoused in *Cipollone vs. Liggett Group, Inc.* are similar to cases throughout the country. The plaintiff is arguing that the risks of cigarette smoking outweigh any social utility and that cigarette products are defective as a matter of law. Product liability law has undergone changes in "failure to warn" cases, where the standard for a manufacturer to issue a warning is based on reasonable inference that a danger exists. Under such a standard, the usual reasons employed by cigarette companies for failing to warn (e.g., a causal relationship can never be established through epidemiologic study) become deficient. Allegations that the tobacco industry conspired to mislead the public through half-truths and misrepresentations of scientific evidence are often deemed circumstantial. Contributory negligence, an approach used by the defense, attempts to prove that the plaintiff was aware of alleged dangers, but chose to continue smoking. The plaintiff's smoking habit predated health warnings by more than 20 years and resulted in her unwillingness to accept the proposition set forth by the Surgeon General, believing that if cigarette smoking was harmful, the Federal Government would have outlawed sale of the product. This is reinforced by the picture of health, well-being, vitality, glamour, sophistication, and excitement depicted in cigarette advertisements to promote social acceptability of smoking. Before cigarette advertising existed, smoking was not a sign of adulthood, maturity, or sophistication.

86–0310. Garner, D.W. **Product Liability in Cigarette-Caused Fires.** *New York State Journal of Medicine* 85(7):322-323, July 1985.

Two legal theories are available to the plaintiff in sustaining a product suit against the tobacco industry. The first and older theory assumes that a consumer should be told about a product's dangers in order to choose whether to confront the risk. The law is called "the consumer expectation test" of liability, or "failure to warn." A second and newer theory of liability, which assumes that the manufacturer could have eliminated foreseeable dangers from the product, can be used in the case of a cigarette-caused fire. Products subject to this liability are those with "defects in design." Liability lawsuits brought by a victim of fire and a victim of disease from smoking are contrasted. Although fire-safe cigarettes are feasible, cigarettes are purposely designed to burn even when not smoked, making them a fire hazard if dropped on couches or beds. A victim of lung cancer cannot prove that the tobacco industry could market a cigarette that will not cause lung disease, but a victim of a fire can readily prove who did what to whom. The magnitude of liability cases that could be brought by people with smoking-related diseases is likened to the fate of the asbestos industry. Cigarette product liability litigation offers a similar hope of provoking more sensible public policy on smoking and greater accountability by the tobacco industry in matters of public health.

86–0311. Hjalte, K. **Economic Benefits of Giving Up Smoking.** Swedish Institute for Health Economics, IHE Report 1984:5. Lund, Sweden, 1984, 102 pp.

Expected lifetime costs of care and loss of production attributable to smoking are calculated in the second of a series on economic aspects of smoking published by the Swedish Institute for Health. The report also attempts to estimate proportion of costs that could be avoided if smokers ceased to smoke. Cost estimates for lung cancer, emphysema, and ischemic heart disease (three major smoking-related diseases) are calculated for the individual smoker with distinctions drawn for sex, age, and level of tobacco consumption. The information is particularly relevant in assessing different types of antismoking therapy. National estimates can also be derived. Savings (based on 1980 prices) of more than 8,000 million SEK in costs of treatment and 23,000 million SEK in loss of production would result if all smokers quit smoking permanently, and resources could be reallocated to other uses. Methods and formulas used to estimate expected costs during the rest of a smoker's lifetime are described. Separate discussions cover each of the smoking-related diseases. A summary of findings on estimates of disease costs are presented with a number of cost recovery ratios, which express the relationship between present value of expected reduction in costs from cessation of smoking and expected future costs of smoking.

86–0312. Jackson, F.N.; Holle, R.H.O. **Smoking: Perspectives 1985.** *Primary Care* 12(2):197-216, June 1985.

The magnitude of the smoking problem is overwhelming; annual mortality and expense are staggering. Cigarette smoking is accountable for 350,000 (20 percent) of all American deaths each year, yet these deaths, the result of bad health habits, are preventable. The task of changing this apocalyptic problem may seem impossible, but it can begin by physician intervention with each individual patient who smokes. A consistent attitude of nonacceptance of smoking followed with recommendations and support for discontinuation can make a significant impact on the problem. Extending this attitude into community affairs and regional and national politics can result in increased public awareness and, eventually, majority rejection of the costly habit. A history of American smoking, beginning in 1492 when Columbus introduced Western Europeans to the practice of inhaling tobacco, is traced, followed by a comprehensive review of tobacco smoke components, addiction, involuntary smoking, cancer, respiratory effects, cardiovascular disease, pregnancy, and economics of smoking.

86–0313. Kiehne, C. **Achieving a Smoke-Free Society.** *Delaware Medical Journal* 57(7):451-454, July 1985.

To make further progress against tobacco use, smoking must be dealt with as a social, political, and economic issue that goes beyond individuals' freedom of choice. The tobacco industry must be confronted directly, and incentives to not smoke must be created. The tobacco industry carries enormous political and economic power: cigarette expenditures contribute 2.5 percent of the GNP and account for 2.5 percent of total private sector employment. Tobacco advertising dollars influence the objectivity of the media and serve to create significant misconceptions about the health effects of smoking. The industry has also fostered a system of Federal programs that protect and promote tobacco production. However, Congress is showing a willingness to change public policy to reduce smoking's toll. The most important single action to reduce cigarette consumption would be to increase the excise tax. Also, the tobacco allotment and price support system should be eliminated. Finally, the fundamental set of rewards and penalties for smoking should be changed, including lowering insurance rates for nonsmokers, recognizing nonsmoking as the norm, and giving priority to the rights of nonsmokers to clean air.

86–0314. Koop, C.E. **A Smoke-Free Society by the Year 2000.** *New York State Journal of Medicine* 85(7):290-292, July 1985.

A smoke-free society by the year 2000 is achievable through the joint efforts of health professionals, health and antismoking agencies, the mass media, manufacturers, executives, and average citizens. Although 53 million Americans still smoke, smoking is slowly declining because (1) women are becoming aware of the link between smoking and lung cancer; (2) increased cost is having an effect on cigarette consumption; and (3) nonsmokers are becoming more militant against smoking, a trend that can be developed into a national goal. If only 10 percent of the 33 million smokers who visit their physician once a year are encouraged to quit smoking through physician intervention programs, the impact on health and the economy would be enormous. The mass media can help by keeping the issue in the public eye; manufacturers can flood the market with bumper stickers, lapel pins, and T-shirts; and executives can assist employees in breaking the smoking habit. The average citizen can help by demanding smoke-free hotels, taxis, rental cars, waiting rooms, offices, schools, and restaurants.

86–0315. Krantz, D.S.; Grunberg, N.E.; Baum, A. **Health Psychology.** *Annual Review of Psychology* 36:349-383, 1985.

Cigarette smoking is the single most preventable cause of mortality and morbidity in the United States. Premature mortality from cigarette smoking results from increased rates of several diseases, primarily coronary heart disease, cancers of the respiratory tract, emphysema, and bronchitis. The likelihood of premature mortality increases with the amount smoked and the duration of smoking and decreases with time following cessation. Initiation of smoking involves social, psychological, and perhaps psychobiological factors. The same psychological and social factors act to maintain behavior. The biological and psychobiological factors relating to the addictive mechanisms in smoking are discussed. Techniques employed to encourage cessation of smoking include public health education, individual and medical counseling, persuasive communications with phonecall campaigns, drug treatments, hypnotherapy, behavior modification approaches, cognitive therapy, group support, and multicomponent interventions that combine a number of techiques. Prevention approaches have considered and applied some of the same psychological principles discussed in the initiation of smoking. Because of the related risks, research has concentrated on the effects of smoking rather than on the effects of cessation. Other topics covered are (1) mechanisms linking behavior to physical disease; (2) stress and its effect on health; (3) psychoneuroimmunology; (4) behavioral factors in cardiovascular disorders; (5) obesity and eating disorders; (5) compliance with health care regimens; and (6) prevention of disease and promotion of health.

86–0316. LACMA Physician. **Forest Tennant Jr. MD—Consultant to the Dodgers on Drug Abuse—Discusses Drug Use and Medicine's Role in Treating the Problem.** *LACMA Physician* 115(5):41-45, March 1985.

The biggest drug problem in sports today is marijuana, costing more ballplayers their careers than all other drugs and alcohol combined. It is estimated that 30 to 50 percent of young athletes, aged 18 to 25, have had experience with drugs. On the basis of the latest research, an addict is described as a person who strives to keep an effective drug level in plasma 24 hours a day. Whether the drug is nicotine, marijuana, cocaine, heroin, or PCP, the addict will reingest whenever the plasma level drops below about 10 nanograms. Marijuana stays in the plasma for 5 to 8 days, and when used once every 5 days, is maintained in the bloodstream at all times. Today's marijuana is 5 to 10 percent more potent than that used 5 to 10 years ago.

Evidence is emerging that once a person is addicted to a drug, including nicotine, the brain chemistry is permanently altered. It is suggested that most people who become addicted to drugs have biochemical genetic defects, and addiction may induce permanent biochemical changes. For this reason, treatment for drug dependence must be medically, not psychologically, based. Drugs damage neurotransmitter systems, including nerve endings, and probably fine muscle groups in the brain, eye, and hands. For an athlete, use of marijuana may become devastating. Long-term use of marijuana and cocaine also damages ability to handle stress and pain.

86–0317. Lock, P.; McEwen, J.; Moreton, W., et al. **Action on Smoking at Work. A Guide to Good Practice.** Academic Department of Community Medicine, King's College School of Medicine and Dentistry. Nottingham, Russell Press, March 1985, 43 pp.

The effects of workplace passive smoking has emerged as an important issue in Great Britain, inevitably raising the question of a balance between the needs of smokers and nonsmokers. Despite increasing demands from both nonsmokers and smokers for action, the majority of workplaces in Great Britain have yet to realize the benefits of implementing a policy on smoking. A blueprint for action is presented, designed for anybody concerned about controlling smoking in the workplace. It is intended as a discussion document and includes an evaluation sheet for comments. Case studies are also presented to give an idea of the range of actions being taken. Topics for discussion are: (1) preparing for action; (2) taking action; (3) practical considerations in establishing policies; (4) support for action on smoking at work; (5) effect of smoking on health; and (6) effect of tobacco on society.

86–0318. Miller, G.H. **The "Less Hazardous" Cigarette: A Deadly Delusion.** *New York State Journal of Medicine* 85(7):313-317, July 1985.

The "safer" or "less hazardous" cigarette is a deadly delusion based on unsubstantiated research and wishful thinking. Major justification for developing a less hazardous cigarette was the assumption that most smokers cannot stop smoking. Tobacco companies capitalized on this assumption and low tar and nicotine claims became major themes of cigarette advertising, which made no mention of other harmful components in cigarette smoke, such as the increased levels of carbon monoxide. It is suggested that the "critical values" used in the mid-1970s to determine safe levels for smoke components were based on speculation rather than fact. There have been numerous reports over the last decade on the potential hazards of low-tar and low-nicotine cigarettes (e.g., excessive amounts of carbon monoxide are inhaled through ventilated cigarettes). It has also been reported that smoking machine measurements of nicotine do not allow for human smoking characteristics such as deeper inhalation or increased puffs/minute, and that some flavor and aroma additives can be dangerous. The most damaging evidence, however, is from epidemiological studies that indicate smokers of filter cigarettes have a higher incidence of cardiovascular disease and die at a younger age than smokers of nonfilter cigarettes.

86–0319. New Jersey Group Against Smoking Pollution, Inc. **Toward a Smoke-Free Workplace. A Handbook for the Business Community.** New Jersey Group Against Smoking Pollution, Inc. New Jersey, BDT Graphics, 1985, 20 pp.

This guidebook, compiled for the business community, examines nonsmoking policies of various U.S. business facilities and includes a Model Policy based on provisions used successfully by companies. The booklet (1) explores the issue of a smoke-free workplace, (2) discusses the American view of smoking in the 1980s, (3) provides medical evidence against smoking, (4) calculates the costs of smoking, (5) examines the legal implications of controlling smoking in the workplace, and (6) presents an outline for establishing a smoking policy. A reference list of companies with nonsmoking policies is also provided. The handbook is offered for sale by the New Jersey Group Against Smoking Pollution, Inc. (105 Mountain Avenue, Summit, New Jersey 07901).

86–0320. Repace, J.L.; Lowrey, A.H. **An Indoor Air Quality Standard for Ambient Tobacco Smoke Based on Carcinogenic Risk.** *New York State Journal of Medicine* 85:381-383 July 1985.

Complete physical separation of smokers from nonsmokers (on different ventilation systems) or total prohibition of smoking in the workplace appear to be the only feasible alternatives for reducing the risk of lung cancer from passive smoking to below the maximum risk considered acceptable by Federal standards. An indoor air quality standard for ambient tobacco smoke in workplaces is derived based on limiting the involuntary carcinogenic risk to nonsmokers to the maximum level considered acceptable by Federal regulatory agencies for environmental carcinogens in air, water, or food. This risk level corresponds to a 1-in-100,000 chance of contracting fatal lung cancer in a working lifetime of 40 years. To achieve acceptable risk, the maximum daily average concentration of tobacco tar for a typical office must be 0.75 $\mu g/m^3$ air. At typical smoking occupancies for an office environment, achieving this standard would require impractical amounts of ventilation or prohibitive costs for air cleaning equipment. (Auth. Abs. Mod.)

86–0321. Rourke, J.; Rourke, L. **British Medical Association Attacks Cigarette Smoking. (Letter).** *Canadian Medical Association Journal* 132(7):735, April 1985.

The attack on cigarette smoking by the British Medical Association (BMA, Addiction Research Foundation's *Journal* 13(12):1, 1984) is applauded. The BMA urged more realistic warnings on cigarette packages and a complete ban on tobacco advertising and promotion. Cigarette smoking is the most avoidable cause of lung cancer and a major avoidable causative factor in myocardial infarction and stroke. Therefore, primary prevention of such diseases should be a high priority. The Canadian Medical Association and Canadian physicians are asked to take a stand (similar to that of the BMA) against promotion of cigarette smoking.

86–0322. Shultz, J.M. **Perspectives on the Economic Magnitude of Cigarette Smoking.** *New York State Journal of Medicine* 85(7):302-306, July 1985.

The costs of smoking in the United States, estimated at between 39 and 55 billion dollars annually (400 to 500 dollars in excess costs to employers per smoking employee), will have an important effect on future health care programs and on corporate and societal decisions with regard to smoking control policies. Methodology for cost of illness (COI) calculations is undergoing constant refinement. The compounding of errors in economic calculations with errors in epidemiologic estimates of attributable risk poses a significant threat to the precision of smoking cost estimates. Methodologies for determining costs of smoking are examined and critiqued by health economists from several vantage points: prevalence-based calculations of national economic costs of smoking; adaptation of national estimates to calculate statewide smoking costs; estimates of costs of smoking to business; and prospective, incidence-based estimates of expected costs to individuals who smoke.

86–0323. Simopoulos, A.P. **The Health Implications of Overweight and Obesity.** *Nutrition Reviews* 43(2):33-40, February 1985.

In an overview of the health effects of excess weight, it was found that smoking distorts the health risks associated with nonappropriate body weight. Mortality in underweight people has been shown to be largely associated with smoking. In one analysis, 80 percent of underweight men were smokers compared with 55 percent of extremely overweight men. There was a higher proportion of ex-smokers in the lower weight groups. The high percentage of smokers almost completely confounds the relationship between body weight and mortality by exaggerating the risk of being under average weight and understating the risk of being overweight. It is concluded that optimal weight cannot be defined without taking smoking into account. The definitions of desirable body weight, body mass index, metropolitan relative weight, skinfold thickness, and frame size are reviewed, the influence of duration of obesity is discussed, and the history of various weight tables is given.

86–0324. Slade, J.D. **A Disease Model of Cigarette Use.** *New York State Journal of Medicine* 85(7):294-297, July 1985.

Activities of tobacco companies are likened to the immunologic strategies of certain parasites and viruses to counter a host's natural defenses in a disease model of cigarette use for the study of smoking. The model is used in a discussion of disease stages and to demonstrate similarity between cigarette marketing and tobacco lobbying techniques with actions and effects of infectious disease agents. Cigarette-caused morbidity and mortality can be interrelated many ways. The model developed by medical researchers to establish the nature and extent of health consequences uses smoking as the central event. However, more comprehensive models are helpful when control and prevention strategies are considered. Largely because of the complex cultural and economic relationships involved, knowledge about the enormous losses caused by cigarettes has not yet led to large-scale, rational control measures. The suggested model is offered as a framework in the development of such control measures and as a structure for further research and for instruction of health professionals about cigarette use.

86–0325. Temple, N.J. **Simplicity—The Key to Fruitful Medical Research.** *Medical Hypotheses* 17(2):139-145, June 1985.

Survey data in 1950 showed that the majority of lung cancer patients smoked cigarettes. Most research on lung cancer since that time has done little more than confirm and extend this finding. Most medical knowledge of practical benefit derives from simple research, particularly in the area of prevention. Medical research is divided into two broad categories: complex, which includes all studies of intricate body mechanisms; and simple, which includes studies of simple body mechanisms and deals mainly with direct relationships between human environmental or lifestyle factors and disease incidence (or with analogous studies on animals). Only a small fraction of cancer research has consisted of simple investigations into factors involved in cancer etiology; however, those investigations have contributed a large part of useful knowledge (e.g., the role of a high fiber diet in prevention of colon cancer). Human studies combined with tests using animal models of cancer have provided practical medical knowledge. In contrast, complex research such as gene regulation or the metabolism of the thousands of chemicals in tobacco smoke and their effects on the body has been of minute value. It is suggested that medical researchers de-emphasize test tubes in favor of whole humans and animals. (Auth. Abs. Mod.)

86–0326. U.S. Department of Health and Human Services. **Bibliography on Smoking and Health 1984.** U.S. Department of Health and Human Services, Public Health Service, Office of Smoking and Health, Public Health Service Bibliography Series No. 45, DHHS (PHS) 85-50196, April 1985, 559 pp.

More than 2,000 abstracts of current literature on smoking and health maintained at the Technical Information Center (TIC) of the Office on Smoking and Health are contained in a 1984 bibliography distributed by the U.S. Department of Health and Human Services. The technical collection, consisting of about 55,000 documents (the majority published since 1960), is available for reference to researchers and others in the field of smoking and health. Free literature searches consisting of comprehensive bibliographic printouts on topics of current interest in smoking and health are obtainable by researchers by request through TIC's computerized search and retrieval system (forms are contained in *Smoking and Health Bulletin* issues or may be requested from TIC). Information regarding availability of articles listed in the bibliography or services and publications of the Office on Smoking and Health may be obtained by writing or calling TIC (Park Building, Room 116, 5600 Fishers Lane, Rockville, MD 20857; Phone: 301-443-1690).

86–0327. Wallis, C. **Into the Mouths of Babes.** *Time*, pp. 68, July 15, 1985.

Use of smokeless tobacco has become alarmingly popular among American youth, inspired perhaps by sports idols and TV promotion. Sales of snuff in the United States is up 60 percent since 1978, and local surveys (Oklahoma, Texas, and Massachusetts) suggest that between 20 to 40 percent of high school boys are chewing and dipping. In Texas, 55 percent of dippers started before the age of 13. Dipping causes visible damage within a few months, according to dentists. Gums may recede, teeth may loosen, biting surfaces may abrade, and tough white patches called leukoplakia (malignant in 3 to 6 percent of cases) may appear on the gums and cheek. Snuff raises blood pressure, slows reaction time, and is more addictive than cigarettes. A major National Cancer Institute study found that women who used snuff for several decades have nearly 50 times the normal risk of developing oral cancer. Massachusetts, which is leading the antisnuff campaign, requires cancer warnings on all packages of smokeless tobacco. Other states are considering similar legislation. Tobacco industry lobbyists are arguing that the cancer association has not been proved. In the meantime, the U.S. Tobacco Company is battling a 147 million dollar product liability suit being brought by the mother of a youth who died from dipping snuff.

86–0328. Williams, D.C.; Whitaker, J.R.; Jennings, W.G. **Measurement of Nicotine in Building Air as an Indicator of Tobacco Smoke Levels.** *Environmental Health Perspectives* 60:405-410, May 1985.

When smokers and nonsmokers in a large office building were segregated, nonsmokers were still exposed to a substantial amount of tobacco smoke, although gradients of exposure were observed. A gas chromatographic technique was devised for collection and analysis of nicotine concentrations in building air as an indicator of tobacco smoke pollution. Passive tobacco smoke consumption in the smoking area was equivalent to 1.1 cigarettes/8-hour period. Nicotine density in this area was 1.96 µg/m. Restricting smoking to a foyer outside the complex resulted in a slow reduction in nicotine concentrations in the complex. Observed "background" nicotine concentration levels corresponding to from 4 to 7 percent of those encountered in smoking areas demonstrated that central air circulation systems and people movement increase nicotine levels throughout all rooms of a building, regardless of the smoking policies of an individual office complex. (Auth. Abs. Mod.)

See also **86–0236**

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Abstracts 86-0329 - 86-0657

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ISSN: 0081-0363
MARCH - APRIL 1986
Abstracts 86-0329 - 86-0657

Smoking and Health Bulletin

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CHEMISTRY

86-0329. Jenkins, R.A.; Gayle, T.M. **An Instrumental Cigarette Smoke Monitor Designed for the Direct Measurement of Smoke Particulate Matter Generated in Human Smoking Studies.** *Behavior Research Methods, Instruments, and Computers* 16(3):263-267, 1984.

An instrumental cigarette smoke monitor (CSM) designed for human smoking studies has been developed and validated using a smoking machine as a human surrogate. The cigarette holder contains both smoke-mixing and flow-measurement orifices and a smoke concentration sensor. Smoke flow through the holder and smoke concentration in the holder are determined simultaneously. The two signals are multiplied electronically and the product signal integrated. Integrated response is directly proportional to amount of particulate matter collected immediately downstream of the holder, regardless of cigarette type or way in which the cigarette is smoked. The CSM is sufficiently sensitive to quantitatively determine amounts of total particulate matter generated from cigarette smoke in the 1 mg Federal Trade Commission tar delivery category. (Auth. Abs. Mod.)

86-0330. Sharma, P.K.; Lal, N.; Nagpaul, K.K. **Study of Trace Amounts of U in Snuff.** *Health Physics* 48(6):811-812, June 1985.

The uranium (U) content of several popular brands of snuff was determined using the radiation-damage etch technique with a solid-state nuclear track detector. U content of samples ranged from 7.4 ± 0.3 to 19.1 ± 0.7 ppm, or 2.4 to 6.4 pCi/g. Compared with snuff levels, U concentrations in tobacco are negligible, indicating that the U in snuff is from other sources. It is suggested that the U in snuff may contribute to the incidence of oral cancer among users.

PHARMACOLOGY AND TOXICOLOGY

86-0331. Adolphs, H.-D.; Hildenbrand, G.; Schwabe, H.W., et al. **Urinary Cytology in Workmen Engaged in the Petrochemical Industry With Reference to Non-Industrial Risk Factors.** *Urological Research* 13(2):61-65, 1985.

Routine evaluation of workers in eight petrochemical factories in Germany showed smoking was significantly ($p < 0.05$) related to abnormal urinary cytology. Of the 8,406 workers examined, 358 exhibited Pap 3/4 cytology. Urological examination did not reveal any bladder tumors in workers with either a single Pap 4 or a repeated Pap 3 finding on cytology. Deterioration of cell differentiation correlated significantly with age and cigarette smoking: 3.0 percent of nonsmokers, 4.0 percent of smokers, and 5.3 percent of smokers over 45 years of age showed atypical cytology. Furthermore, a risk group of 720 males over 40 years of age (smokers and coffee drinkers), who were exposed to occupational chemicals, differed from a group not at risk. Age and cigarette smoking seemed to be the determinant factors. No correlation could be found between industrial exposures and urine cytology. (Auth. Abs. Mod.)

86-0332. Alatanta, S.; Klinge, E.; Sjostrand, N.O. **Further Studies of the Effects of Nicotine on the Isolated Bull Retractor Penis Muscle.** *Acta Physiologica Scandinavica* 124(Supplement 542):214, 1985.

A minimum concentration of 15 μmol nicotine was required to induce maximal relaxation of the bovine retractor penis muscle (BRP); the time lag between nicotine application and onset of relaxation response increased with dose. With nicotine concentrations < 600 μmol, tone was spontaneously restored to starting levels, but it was not possible to repeat the response produced by concentrations < 480 μmol without washing out the previous dose. Nicotine also suppressed the automaticity of the BRP. The nicotine-induced response was susceptible to blocking by local anesthetic agents, hypoxia, and ganglionic blocking. Data support the view that nicotine-induced relaxation is the result of selective activation of inhibitory nerves in the BRP muscle, although the more exact point of nicotinic attack remains unknown.

86-0333. Allen, R.A.; Kluft, C.; Brommer, E.J.P. **Effect of Chronic Smoking on Fibrinolysis.** *Arteriosclerosis* 5(5):443-450, September-October 1985.

Smokers had significantly lower baseline blood fibrinolytic activity than nonsmokers in an investigation of the effects of smoking on the fibrinolytic enzyme system in two groups of healthy male volunteers (aged 30 to 40 years): 15 habitual smokers (≥ 20 cigarettes/day) and 15 nonsmokers. Fibrinolysis was studied at rest (baseline) and after infusion of 1-desamino-8-D-arginine vasopressin (DDAVP; 0.4 μg/kg body weight). Fibrinolytic activity was determined by dilute blood clot lysis ($p \leq 0.05$) and euglobulin-fibrin plate assay ($p \leq 0.05$). Analysis showed that the low activities could be attributed to a lower baseline level of extrinsic tissue-type plasminogen activator (t-PA) activity ($p \leq 0.05$) in smokers. There were no significant differences between the groups in various fibrinolytic inhibitors or in the intrinsic fibrinolytic activation pathways. The increased levels of t-PA activity and factor VIII R:Ag in response to DDAVP were also reduced in smokers ($p \leq 0.01$). The relative increase (ratio of post-DDAVP activity/baseline activity) for these parameters was not significantly different for the two groups. Smokers had significantly higher levels of the acute phase reactants $\alpha 1$-antitrypsin ($p \leq 0.002$) and plasminogen ($p \leq 0.02$) and C-reactive protein ($p \leq 0.01$). Data suggest that endothelial cells show a normal responsiveness to DDAVP stimulation in smokers, but produce less t-PA activity and factor VIII R:Ag. (Auth. Abs. Mod.)

86–0334. Beaune, P.; Lemestre-Cornet, R.; Kremers, P., et al. **The Salmonella/Mammalian Microsome Mutagenicity Test: Comparison of Human and Rat Livers as Activating Systems.** *Mutation Research* 156(3):139-146, June 1985.

Cigarette smoke condensate (CSC) was poorly activated to mutagenicity by human liver S9 in the *Salmonella*/microsome mutagenicity test (Ames test). Mutagenicity of various compounds was tested in the Ames test using either rat liver S9 or human liver S9 to determine whether results obtained with rat liver S9 can be extrapolated to humans. CSC was assayed in the TA1538 strain of *Salmonella typhimurium*, which yielded significant numbers of revertants regardless of S9 used. CSC, aflatoxin B_1, and 3-methylcholanthrene (3-MC) were much less mutagenic when activated with human liver S9 than with untreated rat liver S9. Pretreatment of rats with Aroclor increased liver S9 mutagenicity. However, 2-aminoanthracene and 2-aminofluorene were more mutagenic after treatment with human liver S9. It is concluded that results obtained with rat liver S9 cannot be systematically extrapolated to man and that use of human liver S9 should be reinforced.

86–0335. Bieth, J.G. The Antielastase Screen of the Lower Respiratory Tract. *European Journal of Respiratory Diseases* 66(Supplement 139):57-61, 1985.

Emphysema is caused by heavy cigarette smoking, and inherited α_1-proteinaise inhibitor (α_1PI) deficiency is only a minor contributor. Cigarette smoke not only contains oxidants that may inactivate α_1PI, but also contains particles that may activate phagocytes and induce secretion of oxidants, myeloperoxidase, and chemotactic factors, suggesting that smoking may encourage acquired deficiency in active α_1PI. The validity of this assumption rests on the demonstration of oxidized α_1PI in bronchoalveolar lavage and serum. As yet, concentration of oxidized α_1PI cannot be assessed by a direct method. Investigators have compared the concentration of functional α_1PI (elastase inhibitory capacity) with immunoreactive protein in smokers and nonsmokers. Bronchoalveolar lavage fluid and serum studies have yielded conflicting results. Bronchoalveolar lavage collects only the alveolar lining fluid of a limited area of the lung and the sampling may not be homogeneous. Oxidized α_1PI may be more concentrated in the epithelium than in the lining fluid. Cigarette smoking may increase the elastase burden at the alveolar level by inducing release of elastase from neutrophils directly and by prompting the alveolar macrophage to release chemotactic factors that recruit neutrophils in the lung. A clearcut answer must await the availability of a specific assay of oxidized α_1PI. (Auth. Abs. Mod.)

86–0336. Biglan, A.; Gallison, C.; Ary, D., et al. **Expired Air Carbon Monoxide and Saliva Thiocyanate: Relationships to Self-Reports of Marijuana and Cigarette Smoking.** *Addictive Behaviors* 10(2):137-144, 1985.

The relationship between self-reports of cigarette and marijuana smoking and measures of salivary thiocyanate (SCN) and expired air carbon monoxide (CO) was examined in 1,130 7th, 9th, 10th, 11th, and 12th grade students. Self-reports showed that 6.7 percent had smoked only cigarettes, 7.3 percent had smoked only marijuana, and 6.1 percent had smoked both in the previous week. The composite measure of cigarettes smoked correlated well with CO assessments ($r=0.71$, $p<0.01$); however, the correlation decreased slightly when marijuana smokers were deleted ($r=0.61$, $p<0.01$). The dose—response relationship was significantly stronger in 11th and 12th graders ($r=0.80$) than in 10th graders ($r=0.67$, $p<0.01$) and in 9th graders ($r=0.75$) compared with 7th graders ($r=0.51$, $p<0.01$). Self-reported cigarette smoking also correlated significantly with SCN levels ($r=0.30$, $p<0.01$); however, the correlation decreased significantly following deletion of marijuana smokers ($r=0.19$, $p<0.01$). Overall, expired air CO was a better predictor than SCN of self-reported smoking behavior.

86–0337. Bridges, R.B. **Protective Action of Thiols on Neutrophil Function.** *European Journal of Respiratory Diseases* 66(Supplement 139):40-48, 1985.

In vitro inhibition of polymorphonuclear leukocyte (PMN) chemotaxis by cigarette smoke, its fractions, and constituents was studied in blood of healthy male nonsmokers. Earlier studies had attributed a reduced chemotactic response of PMN isolated from peripheral blood of smokers to acute effects of smoking. Impaired neutrophil chemotaxis is most likely to occur in tissues directly exposed to cigarette smoke (i.e., the oral cavity and lungs). Thiols, such as cysteine or reduced glutathione, provided partial to complete protection from smoke effects (when added prior to exposure), suggesting that major inhibitory effect of cigarette smoke on chemotaxis is a result of action of smoke oxidants and/or thiol-reactive substances. Whole cigarette smoke, gas phase, water-soluble fractions, and more polar constituents of cigarette smoke condensate are all potent and largely irreversible inhibitors of neutrophil chemotaxis. Acrolein and crotonaldehyde appear to be most potent inhibitors. The mechanism of chemotaxis inhibition by unsaturated aldehydes appears to be the result of irreversible binding to essential sulfhydryl groups of cellular proteins. (Auth. Abs. Mod.)

86-0338. Bridges, R.B.; Fu, M.C.; Rehm, S.R. **Increased Neutrophil Myeloperoxidase Activity Associated With Cigarette Smoking.** *European Journal of Respiratory Diseases* 67(2):84-93, August 1985.

Neutrophils from 49 young male smokers contained significantly higher myeloperoxidase (MPO) activity than those from 49 age-matched, nonsmoking controls, while elastase-like activity did not differ in the two populations. MPO activity was increased in some smokers, but did not correlate significantly with increased number of peripheral blood neutrophils, smoking (present or cumulative), or mild pulmonary dysfunction detected by forced expiratory spirometry and single breath nitrogen test. Increased MPO activity in smokers' neutrophils may contribute to greater risk of obstructive pulmonary disease in some smokers by an exacerbation of protease—antiprotease imbalance in the lung. This hypothesis is supported by prior observations that neutrophils are recruited in greater numbers into lungs of smokers and that MPO (in the presence of H_2O_2 and chloride ion) oxidatively inactivates antiproteases of both alveoli and mucus-lined airways. (Auth. Abs. Mod.)

86-0339. Burgess, J.A.; Stevens, C.W.; Fahl, W.E. **Mutation at Separate Gene Loci in *Salmonella typhimurium* TA100 Related to DNA Nucleotide Modification by Stereoisomeric Benzo(*a*)pyrene 7,8-Diol-9,10-epoxides.** *Cancer Research* 45(9): 4257-4262, September 1985.

The relationship between different benzo(*a*)pyrene (BaP) diol-epoxide-nucleotide species and frequency with which mutations occur at two separate gene loci in *Salmonella typhimurium* was investigated by exposing suspensions of *S. typhimurium* TA100 or TA1535 cells to pure enantiomeric forms or racemic mixtures of ^{3}H-labeled BaP *anti-* or *syn*-7,8-dihydrodiol-9,10-epoxide. Diol-epoxide-induced cytotoxicity and mutation frequencies at the *hisG* and *gpt* loci were determined. Significant differences in mutagenic efficiency were observed for the different enantiomeric diol-epoxides and mutagenic efficiencies were the same at both loci. Combined results of mutation and adduct characterizations suggest that there are basic differences in the structural configuration of each adduct species that are recognized during errant DNA repair, which lead to base changes at a frequency that is relatable to the configuration of the original adduct lesion. (Auth. Abs. Mod.)

86-0340. Cerna, M.; Angelis, K.J. **Mutagenicity in the Salmonella/Microsome Assay of Tobacco Condensates Formed During Pipe Smoking.** *Mutation Research* 143(3):161-164, July 1985.

Condensates collected within the pipe cavity after smoking a natural tobacco and a cavendish-type tobacco, either unwrapped or wrapped in a paper "saver" bag, were tested for mutagenicity in the Salmonella/mammalian microsome assay with *Salmonella typhimurium* strains TA98 and TA100. Liver S9 homogenate for metabolic activation was prepared from C57/Bl mice induced by Delor 103, a mixture of polychlorinated biphenyls. With S9 mix, both types of condensate increased the number of revertants in the TA98 strain. However, only the highest concentration of cavendish tobacco (100 μL/plate) induced a doubling or more in revertants compared with controls. No mutagenicity was observed with TA98 in the absence of S9 mix. Treatment of TA100 with 100 μL cavendish tobacco condensate/plate doubled the frequency of revertants without S9; a further increase was seen when S9 was added. Condensate from natural tobacco did not induce revertants in TA100. The mutagenicity of both types of tobacco was enhanced by wrapping the tobacco in a paper "saver" bag. It is speculated that the difference in mutagenic activities of the two tobaccos may be due to a difference in composition and formation of tobacco-specific nitrosamines during smoking.

86-0341. Chilton, C.P.; Rose, G.A. **Urinary Chemiluminescence—An Evaluation of Its Use in Clinical Practice.** *British Journal of Urology* 56(6):650-654, December 1984.

The phenomenon of urinary chemiluminescence (UCL) in smokers with bladder cancer and its possible use as a tumor marker are described. The substance, which acts like a carcinogen and is strongly associated with bladder tumors and smoking, has defied analysis, although the chemical compound or its precursor is known to be ultrafilterable, freely dialysable, and of a molecular weight less than 500. During oxidative reactions, the substance exhibits UCL. It is this release of energy in the form of light that activates the intracellular changes responsible for carcinogenesis. UCL was measured in 110 patients being followed up endoscopically for transitional cell carcinoma of the bladder (TCCB) and 67 controls, and history of smoking and drug use was obtained (intake of Vitamin C can suppress UCL). Estimates of UCL confirmed previously reported trends; smokers with bladder cancer had the highest UCL and nonsmoking controls the lowest. However, results did not reach statistical significance. Wide variations in findings do not as yet allow UCL to be of practical clinical use. (Auth. Abs. Mod.)

86-0342. Clarke, P.B.S.; Schwartz, R.D.; Paul, S.M., et al. **Nicotinic Binding in Rat Brain: Autoradiographic Comparison of (^{3}H)Acetylcholine, (^{3}H)Nicotine, and (^{125}I)-α-Bungarotoxin.** *Journal of Neuroscience* 5(5):1307-1315, May 1985.

Autoradiography was used to produce detailed maps of (^{3}H)nicotine, (^{3}H)acetylcholine, and (^{125}I)-α-bungarotoxin ((^{125}I)BTX) labeling; near-adjacent tissue sections were compared at many levels of the rat brain. Maps of high affinity agonist labeling were strikingly concordant, with highest densities in the interpeduncular nucleus, most thalamic nuclei, superior colliculus, medial habenula, presubiculum, cerebral cortex (layers I and III/IV), and the substantia nigra pars compacta/ventral tegmental area. The pattern of (^{125}I)BTX binding was strikingly different, the only notable overlap with agonist binding being the cerebral cortex (layer I) and superior colliculus. (^{125}I)BTX binding was also dense in the inferior colliculus, cerebral cortex (layer VI), hypothalamus, and hippocampus, but virtually absent in the thalamus. Results suggest that the high affinity agonist-binding sites in the rat brain correspond to nicotinic cholinergic receptors similar to those found at autonomic ganglia. BTX binding sites may also serve as receptors for nicotine and are possibly related to neuromuscular nicotinic cholinoceptors. (Auth. Abs. Mod.)

86–0343. Cronan, T.; Conrad, J.; Bryson, R. **Effects of Chronically Administered Nicotine and Saline on Motor Activity in Rats.** *Pharmacology, Biochemistry and Behavior* 22(5):897-899, May 1985.

Nicotine chronically administered to rats increased motor activity in both sexes on the first 2 days of drug administration, with females being more active than males. However, by the 4th day, no significant differences in activity levels were observed between nicotine-treated and control animals (48 male and 48 female albino rats about 165 days old). Activity was monitored hourly for 192 hours. Nicotine was administered via a subcutaneously implanted osmotic minipump to effect an 8-hour off, 16-hour on flow. Animals administered saline were more active during days 3, 4, 5, and 6; groups were virtually identical in activity on days 7 and 8. None of the differences were statistically significant. The greater activity of females is consistent with previous findings. The time course of development of apparent tolerance to the activity-enhancing effects of small dosages of nicotine is similar to the time course of larger dosages of nicotine. The failure to find a sex-by-drug or sex-by-time interaction provides further evidence that sex differences are not produced by differences in the rate of nicotine metabolism. (Auth. Abs. Mod.)

86–0344. Epenetos, A.A.; Munro, A.J.; Tucker, D.F., et al. **Monoclonal Antibody Assay of Serum Placental Alkaline Phosphatase in the Monitoring of Testicular Tumours.** *British Journal of Cancer* 51(5):641-644, May 1985.

Analyses of the usefulness of placental alkaline phosphatase (PLAP) to monitor treatment response in seminoma patients found that smoking significantly elevates serum PLAP levels. A monoclonal antibody that recognizes both PLAP and PLAP-like alkaline phosphatase was incorporated in a solid phase immunoassay and used to measure PLAP levels in samples from 148 patients with germ cell neoplasms of the testis. High levels of PLAP were found in all patients with active seminomas compared with those in clinical remission. More important, changing levels of PLAP correlated with the course of disease in 79 samples from 33 patients with seminoma ($p<0.0001$). In seminoma patients in remission, smokers showed mean PLAP values of 0.32 O.D.; nonsmokers had a mean value of 0.15 O.D. ($p<0.001$). However, a smoking effect could not be detected in patients with clinically active seminoma (smokers 0.72 O.D., nonsmokers 0.66 O.D.). (Auth. Abs. Mod.)

86–0345. Ercan, Z.S.; Turker, R.K. **Nicotine Is a Competitive Antagonist for H_1-Receptors in Smooth Muscles.** *Archives Internationales de Pharmacodynamie et de Therapie* 274(1):24-30, March 1985.

Nicotine had a competitive inhibitory effect against histamine H_1-receptors in an examination of the effects of nicotine on histamine-induced contractions in isolated aortic strips from adult rabbits and in isolated tracheal muscle and ileum from adult guinea pigs. Dose—response and cumulative dose—response curves were determined in all muscles by infusing histamine over superfused tissue preparations. Nicotine was added at different concentrations and dose—response curves of histamine were again determined. The median effective dose and pA_2 values were calculated for each experiment. Addition of nicotine to the bath system caused contraction in aortic strips and ileum and relaxation in tracheal muscle. Contractile responses to histamine were diminished by nicotine addition in all tissues and dose—response curves remained parallel to but shifted to the right of their corresponding control curves. Increased concentrations of nicotine caused a further shift in the dose—response relationship of histamine. Calculated pA_2 values of nicotine against histamine were essentially similar for all muscle preparations. Maximum inhibition by nicotine of the responses to histamine occurred within 20 minutes after addition to the bathing medium. Complete recovery occurred within 1 hour.

86–0346. Everson, R.B.; Ratcliffe, J.M.; Flack, P.M., et al. **Detection of Low Levels of Urinary Mutagen Excretion by Chemotherapy Workers Which Was Not Related to Occupational Drug Exposures.** *Cancer Research* 45(12):6487-6497, December 1985.

Mutagenesis assays of human body fluids revealed increased urinary excretion of mutagens from smokers engaged in preparing, handling, or administering cancer chemotherapeutic agents. Urine specimens from nurses, pharmacists, and technicians showed no evidence of an association between occupational exposure to chemotherapy drugs, possibly owing to protective measures taken at the hospitals surveyed. None of the observed associations with smoking were changed substantially by statistical adjustment for the occupational category of the participant (nurse or pharmacist), hospital of employment, or values of concurrent solvent controls for the mutagenesis assays, and associations with occupational exposures were not changed by controlling for smoking. In addition to the large increases for smokers, testing of extracts of urine from nonsmokers with *Salmonella typhimurium* strain TA98 yielded mutagenicity values that averaged about 50 percent higher than values for solvent controls. It is believed the increases were associated with urinary excretion of low levels of mutagen by a high proportion of subjects tested. Assays from 18 current smokers compared with 53 nonsmokers in a larger analysis (two hospitals) indicated moderate tobacco consumption (only 5 smoked ≥20 cigarettes/day). Curves for smokers and nonsmokers appear to diverge at about the 50th percentile for TA98, suggesting an effect for almost half of the smokers. An effect can be seen in less than 20 percent of subjects for strain TA100. Among smokers, there was a relatively weak but highly significant correlation between the average number of cigarettes smoked/day and revertant counts in assays with tester strain TA98 ($p<0.001$) but not with TA100 ($p<0.34$). (Auth. Abs. Mod.)

86–0347. Ewers, U.; Brockhaus, A.; Dolgner, R., et al. **Environmental Exposure to Cadmium and Renal Function of Elderly Women Living in Cadmium-Polluted Areas of the Federal Republic of Germany.** *International Archives of Occupational and Environmental Health* 55(3):217-239, 1985.

Residence, smoking, and husbands' occupational exposure to heavy metals were the most influential factors in total variation of cadmium body burden in 286 65- and 66-year-old women. Subjects were from three cities: Stolberg and Duisburg, which are known to be highly contaminated, and Dusseldorf, which served as a reference area. Prevalence of smoking among the women was 19.2 percent in Stolberg, 18.0 percent in Duisburg, and 23.3 percent in Dusseldorf. In the three areas, smokers had higher average levels of cadmium in blood (CdB) and urine (CdU) than ex- and nonsmokers. Also, average CdB and CdU levels differed significantly in the order Stolberg > Duisburg > Dusseldorf. Average serum creatinine levels were significantly higher in Stolberg than in Duisburg and Dusseldorf. However, urinary excretion of low molecular weight proteins, albuminuria, total proteinuria, aminoaciduria, phosphaturia, and some other biological findings were not significantly different. Prevalence of hypertension and relative frequency of hypertensive subjects did not differ significantly. There was no exposure—response relationship between CdU and tubular proteinuria in the range of the CdU levels found (0.1 to 5.2 μg/g creatinine), but albuminuria tended to be increased at CdU levels >2 μg/g creatinine. (Auth. Abs. Mod.)

86–0348. Finnegan, M.J.; Pickering, C.A.C.; Davies, P.S., et al. **Factors Affecting the Development of Precipitating Antibodies in Workers Exposed to Contaminated Humidifiers.** *Clinical Allergy* 15(3):281-292, May 1985.

Smoking showed a strong negative but reversible correlation with development of precipitins in workers exposed to heavily and moderately contaminated humidifiers. A total of 601 sera from groups of workers was examined by the double diffusion test for precipitating antibodies to humidifier extracts. Skin prick tests for a control substance, three common inhaled antigens, and an extract from the humidifier were performed in 103 subjects exposed to a heavily contaminated humidifier. A strong inverse relationship between current smoking and precipitins was detected ($p<0.001$). Pack-years smoked had no bearing on precipitin level. Effect of smoking appeared to reverse within 3 years after cessation. Duration of exposure also had a major effect on development of precipitins. These relationships were not apparent in groups exposed to moderately contaminated humidifiers. Levels of airborne antigen were measured using a competitive ELISA inhibition assay and were found to be much lower in sites with moderately contaminated humidifiers than at sites with heavily contaminated humidifiers. Results suggest that airborne antigen levels are crucial in determining pattern and strength of precipitin response in smokers and nonsmokers exposed to contamined humidifiers. (Auth. Abs. Mod.)

86–0349. Gardner, M.J. **Factors Influencing the Disposition of Theophylline.** Doctoral Dissertation, State University of New York at Buffalo, University Microfilms International 84-10546, February 1984, 320 pp.

The biotransformation of plasma theophylline in tobacco and marijuana smokers and the effects of tobacco smoking and oral contraceptive (OC) use on the metabolic pathways and disposition of theophylline were investigated. Theophylline was cleared more rapidly from the blood of both tobacco and marijuana smokers with a mean increase in total clearance from 52 mL/kg/hour in nonsmokers to 74 mL/kg/hour in subjects who smoked either material alone. An additive increase in clearance to 93 mL/kg/hr occurred when both substances were smoked. Significant elevations (40 percent) in plasma theophylline clearance were observed in women who smoke. OC use, which resulted in decreases in clearance (28 percent), tended to cancel this effect. Mean theophylline clearance was 49.1 mL/kg/hour in nonsmokers who did not use OCs compared with 49.7 mL/kg/hour for smokers who used OCs. Smoking also increased clearance rates for 3-methylxanthine (55 percent), 1-methyluric acid (49 percent), and 1,3-dimethyluric acid (26 percent). Excretion of unchanged theophylline was significantly elevated in OC users and diminished in cigarette smokers. Serum thiocyanate analysis was used in all studies to confirm smoking status. A separate analysis to identify utility and specificity of this assay is included.

86–0350. Gilliam, D.M.; Schlesinger, K. **Nicotine-Produced Relearning Deficit in C57BL/6J and DBA/2J Mice.** *Psychopharmacology* 86(3):291-295, June 11, 1985.

A modified 2 x 2 state-dependent learning design was applied to assess the behavioral and pharmacological effects of nicotine on learning and relearning in mice, determine the dose—response relationships of nicotine, and investigate individual differences in the response to nicotine through strain and sex comparisons. Male and female C57BL/6J (C57) and DBA/2J (DBA) mice were injected with a control (saline) solution or with 0.5, 1.0, or 2.0 mg/kg nicotine 5 minutes before the start of training and, following a 24-hour period, 5 minutes before retraining in an automated wheel-turn avoidance chamber. Nicotine had no effect on acquisition of the learning task. However, depending on strain and sex, nicotine did have an effect on relearning. In C57 males, relearning was unaffected, whereas in C57 females and DBA males and females there was a retrieval deficit, suggesting that those mechanisms underlying the retrieval of previously learned information are, in part, mediated or modulated by perturbations within nicotine-sensitive areas of the central nervous system. (Auth. Abs. Mod.)

86–0351. Gorelik, E.; Peppoloni, S.; Overton, R., et al. **Increase in H-2 Antigen Expression and Immunogenicity of BL6 Melanoma Cells Treated With *N*-Methyl-*N'*-nitronitrosoguanidine.** *Cancer Research* 45(11, Part 1):5341-5347, November 1985.

Treatment of BL6 melanoma cells in vitro with N-methyl-N'-nitronitrosoguanidine (MNNG) dramatically increased expression of H-2K^b antigens and β_2 microglobulin, but not class 2 major histocompatibility complex antigens. The treated tumor cells also became immunogenic and were rejected in 70 percent of syngeneic C57BL/6 recipients, whereas the tumor cells produced progressively growing tumors in 100 percent of irradiated (550 R) or nude mice. In contrast to effects of MNNG treatment, no influence on H-2 antigen expression or tumorigenicity was found when cells were treated with 5-azacytidine, phorbol myristate acetate, 5-bromodeoxyuridine, theophylline, or 6-thioguanine. H-2 antigen expression and the tumorigenic properties of 48 individual clones derived from BL6T2 melanoma line and 15 clones from the original BL6 melanoma were investigated. No H-2 antigens were found on the cell surface of the parental BL6 clones, whereas all tum-clones from the BL6T2 line expressed high levels of H-2 antigens. Although four of six tested tum-clones had high levels of H-2^b antigen expression similar to that of tum-clones, they were nonimmunogenic. Interferon treatment of BL6 melanoma cells induced an increase in the expression of β_2-microglobulin and class 1 H-2^b antigens but not an increase in immunogenicity. Detection of tumor-associated transplantation antigens on the melanoma cells also appeared to be dependent on the level of expression of H-2 antigens. Data indicate that an increase in major histocompatibility complex antigen expression is essential but not sufficient for the immunogenicity of tumor cells. (Auth. Abs. Mod.)

86–0352. Green, G.M. **Pharmacoprevention of Tobacco Smoke Effects on Macrophage Cells.** *European Journal of Respiratory Diseases* 66(Supplement 139):113-116, 1985.

Sulfhydryl-containing agents may have a role in preventing environmentally induced injuries to alveolar macrophages, according to in vitro studies on tobacco smoke effects and pharmacopreventive measures. Tobacco smoke produces a variety of morphologic, physiologic, biochemical, and enzymatic changes in pulmonary alveolar macrophage cells that affect pulmonary antibacterial defenses, cellular regulatory activity, and tissue pathogenesis of inflammation, proteolysis, and fibrogenesis. A common denominator of enzymes found to be inhibited by cigarette smoke components is a sulfhydryl moiety that is critical to enzyme functioning and highly susceptible to oxidant activity of tobacco smoke constituents. The inhibitory effect of cigarette smoke components on glyceraldehyde 3-phosphate dehydrogenase, calcium and magnesium ATPase, and endoperoxide E-isomerase is quantitatively prevented by addition of sulfhydryl agents such as glutathione and cysteine. Critical functions of whole cell activity such as phagocytosis, energy metabolism, and prostaglandin synthesis and release that are dependent on sulfhydryl enzymes and inhibited by cigarette smoke components are protected when glutathione or cysteine are provided in advance of exposure. These sulfhydryl agents also protect adhesion and cellular morphology from derangement by cigarette smoke components. In vivo studies are recommended to test the hypothesis that bronchopulmonary resistance mechanisms can be protected and enhanced by the administration of sulfhydryl agents as pharmacotherapeutic or pharmacopreventive measures. (Auth. Abs. Mod.)

86–0353. Grenhoff, J.; Aston-Jones, G.; Svensson, T.H. **Nicotinic Effects on the Firing Pattern of Midbrain Dopamine Neurons.** *Acta Physiologica Scandinavica* 124(Supplement 542):279, 1985.

Nicotine (0.5 mg/kg i.p.) or the nicotine antagonist mecamylamine (4.0 mg/kg i.p.) was administered to rats, and activity of midbrain dopamine (DA) neurons was followed for 60 minutes. Nicotine caused a significant increase in the firing rate of substantia nigra (SN) but not ventral tegmental area (VTA) neurons. However, nicotine increased bursting activity in both SN and VTA neurons. Mecamylamine did not influence SN firing rate, but did reduce the firing rate of VTA neurons. No mecamylamine effects on bursting activity were observed in either cell group. Thus, nicotine significantly affects only the bursting DA neurons. Further, the correlation between increases in firing rate and increases in burst activity was not significant either for VTA cells or SN cells. Consequently, nicotine-induced changes in burst activity, i.e., temporal distribution of spikes in midbrain DA neurons, cannot be considered as being simply coupled to changes in firing rate. Rather, this action may be seen as an additional, neuromodulatory effect. (Auth. Abs. Mod.)

86–0354. Griffith, R.B.; Standafer, S. **Simultaneous Mainstream-Sidestream Smoke Exposure Systems II. The Rat Exposure System.** *Toxicology* 35(1):13-24, April 1985.

Equipment for simultaneous mainstream (MS) and sidestream (SS) smoke exposure and monitoring procedures were tested with Sprague-Dawley rats that were exposed for 17 weeks to MS smoke and target exposures of 10, 25, or 50 percent of total SS smoke. Estimated total particulate matter (TPM) dose was highly correlated with the increase in percent carboxyhemoglobin (COHb) for MS and SS smoke, but the COHb/TPM relationships were different. All SS TPM doses were much lower than the MS TPM dose, and the COHb/TPM ratio for SS smoke was much higher than for MS smoke. TPM dose and percent COHb for SS smoke were highly correlated with percent of SS sent to the exposure chambers. There were no significant differences in total weight changes for any of the smoke-exposed groups, but weight changes during the 12- to 17-week period for SS-exposed groups were inversely correlated with level of SS exposure. (Auth. Abs. Mod.)

86–0355. Hesselbrock, V.M.; Shaskan, E.G. **Endogenous Breath Acetaldehyde Levels Among Alcoholic and Non-Alcoholic Probands: Effect of Alcohol Use and Smoking.** *Progress in Neuro-Psychopharmacology and Biological Psychiatry* 9(3):259-265, 1985.

Smokers and alcohol abusers had higher endogenous breath acetaldehyde (AcH) levels than persons who did not smoke or drink. The primary metabolite of ethanol, AcH is potentially toxic to humans and may play a role in the health-related consequences associated with alcohol use. The effects of possible confounding factors on endogenous breath AcH levels were examined in 21 men and 26 women (alcoholics and nonalcoholics). In assessing demographic characteristics (family history of alcoholism and smoking and drinking history) no differences could be attributed to age, sex, or having a family history of alcoholism. Smokers were found to have higher levels of breath AcH than nonsmokers, which is consistent with previous research. It is noted that the higher levels of breath AcH among smokers were found even though subjects had not smoked for at least 8 hours prior to breath sampling. While significant amounts of AcH are found in cigarette smoke, the reason for long-lasting increases in AcH levels is not apparent and remains an area for future research. (Auth. Abs. Mod.)

86–0356. Hickey, R.J. **Treatment of Genetic Hormonal Deficiencies by Nicotine. (Letter).** *Journal of the American Medical Association* 254(10):1311-1312, September 1985.

For many people, cigarette smoking may be symptomatic of a physiological deficiency that is alleviated by nicotine. The deficiency may be in one or more biogenic monoamine neurotransmitter hormones, such as epinephrine. Since genetic heterogeneity in human populations is a reality, variations in characteristics of individual hormones, including genetic deficiencies, are expected and do occur. Nicotine is known to induce release of biogenic monoamine neurotransmitter hormones, such as epinephrine and norepinephrine, from cellular storage. Since behavioral urges have survival value, the urge to smoke seems consistent with the need to alleviate deficient levels of one or more biogenic monoamine hormones. It has been observed that individuals seek and find gratifying those situations that have been highly advantageous in the survival of species. Most smokers enjoy smoking and regret stopping, and an unbiased evaluation of the hypothesis that smokers use cigarettes as a means of behaviorally regulating physiological homeostasis is urged.

86–0357. Hisaoka, M.; Levy, G. **Kinetics of Drug Action in Disease States XI: Effect of Nicotine on the Pharmacodynamics and Pharmacokinetics of Phenobarbital and Ethanol in Rats.** *Journal of Pharmaceutical Sciences* 74(4):412-415, April 1985.

Pretreatment with nicotine increases the sensitivity of rats to the hypnotic effects of phenobarbital and ethanol, interactions that are entirely pharmacodynamic. Adult female rats were pretreated with nicotine (either 0.5 or 1.5 mg/kg i.p. acutely or 0.5 mg/kg i.p. daily for 6 days) to determine whether reported effects of nicotine on barbituate- and ethanol-induced sleeping times in rodents are pharmacodynamic or pharmacokinetic interactions. Phenobarbital or ethanol was infused intravenously at a slow rate until rats lost the righting reflex. Acute pretreatment with nicotine significantly reduced serum, brain, and cerebrospinal fluid (CSF) concentrations of phenobarbital and ethanol at onset of righting reflex loss. Chronic pretreatment with nicotine had no potentiating effects, indicating rapid development of tolerance to nicotine. Neither acute nor chronic pretreatment with nicotine had any apparent effect on elimination kinetics of phenobarbital or ethanol, biochemical indices of hepatic integrity and renal function, or permeability of blood-CSF barrier to protein. Nicotine, unlike morphine, did not increase the nociceptive threshold (tail squeeze) of rats under experimental conditions. (Auth. Abs. Mod.)

86–0358. Hornsby, P.J.; Harris, S.E.; Aldern, K.A. **Hormonal Regulation of Benzo(*a*)pyrene Metabolism in Human Adrenocortical Cell Cultures.** *Biochemical and Biophysical Research Communications* 131(1):167-173, August 30, 1985.

Metabolism of benzo(*a*)pyrene (BaP) in cultured fetal human adrenocortical cells was found to be unresponsive to the xenobiotic inducers 3-methylcholanthrene, benz(*a*)anthracene, and 2,3,7,8-tetrachlorodibenzo-*p*-dioxin. However, exposure to adrenocorticotropic hormone (ACTH) for 48 hours stimulated BaP metabolism threefold, with conversion mainly to the 7,8-diol accompanied by smaller amounts of quinones, phenols, and polar metabolites. Other compounds that stimulate production of adrenocortical cell cyclic AMP (forskolin, cholera toxin, and monobutyryl cyclic AMP), at concentrations that were not cytotoxic, also stimulated BaP metabolism. An investigation into the time-course of ACTH stimulation of BaP metabolism found that maximal activity was achieved after about 48 hours of incubation with ACTH. The ability to experimentally regulate BaP metabolism by hormones in cell culture should provide a useful means of investigating the induction and expression of the cytochrome P-450s involved. (Auth. Abs. Mod.)

86–0359. Hughes, D.A.; Haslam, P.L.; Townsend, P.J., et al. **Numerical and Functional Alterations in Circulatory Lymphocytes in Cigarette Smokers.** *Clinical and Experimental Immunology* 61(2):459-466, August 1985.

Simultaneous numerical and functional studies of circulatory lymphocytes were undertaken in 14 healthy smokers (< 50 pack years each) and 32 nonsmokers. Smokers had significantly more lymphocytes, surface immunoglobulin-bearing cells, total T-cells, and T helper-inducer cells, and tended to have more T suppressor-cytotoxic cells than nonsmokers. Although the proportions of T-cell subsets did not differ significantly between the two groups, in vitro T-suppressor function against the immunoglobulin-secreting response of allogenic B-cells to pokeweed mitogen stimulation was significantly impaired in smokers. The proliferative response of T-cells to phytohemagglutinin was similar in both groups. Data suggest that smoking may exert a selective influence upon a subset of T suppressor cells. In cytotoxicity assays, smokers showed a significant decrease in natural killer cell activity but not in antibody-dependent cellular cytotoxicity. However, alterations are apparently reversible; results from a group of 10 ex-smokers were indistinguishable from those of nonsmokers in all studies. Implications regarding the link between smoking and increased susceptibility to infection and malignancy are discussed. (Auth. Abs. Mod.)

86–0360. Jack, D.B. **Factors Contributing to Variability in Drug Pharmacokinetics. III. Metabolism.** *Journal of Clinical and Hospital Pharmacy* 10(1):25-43, March 1985.

Effects of smoking, age, sex, alcohol consumption, and other known factors that contribute to individual variability in drug metabolism are reviewed. Only a few of the 3,000 gaseous and particulate compounds in tobacco have been studied for their effect on drug metabolism. Polycyclic aromatic hydrocarbons in cigarette smoke are potent inducers of drug-metabolizing enzymes and lead in general to an increased elimination rate of many drugs. Increased clearance of low extraction drugs (warfarin, diazepam, theophyllin, and antipyrine) has been reported, but similar findings were noted for some high extraction drugs (propranolol, pentazocine, and propoxyphene). Far more heavy smokers than nonsmokers have rated some drugs as ineffective, and the side effects directly related to unchanged drug have been reported to be less for heavy smokers taking diazepam. One of the most important interactions is the reported increased clearance of theophylline, a drug with a narrow therapeutic index. Mean clearance of theophylline, 45 mL/min in controls and 100 mL/min in smokers, suggests that heavy smokers require higher doses of theophylline. Theophylline toxicity has been reported to be lower among heavy smokers; however, smokers who quit do not always return to normal clearance. Passive smoking is unlikely to be a significant factor unless subjects spend long periods in smoke-filled atmospheres.

86–0361. Jaiswal, A.K.; Gonzalez, F.J.; Nebert, D.W. **Human *P_1-450* Gene Sequence and Correlation of mRNA With Genetic Differences in Benzo(*a*)pyrene Metabolism.** *Nucleic Acids Research* 13(12):4503-4520, June 1985.

Human inducible P_1-450 mRNA concentrations were highly correlated ($r=0.98$, $n=6$) with genetic differences in benzo(*a*)pyrene metabolism in mitogen-activated lymphocyte cultures. The human P_1-450 gene (6,311 base pairs) and the 5′ (1,604 bases) and 3′ (113 bases) flanking regions were completely sequenced. Four highly homologous boxes (61, 82, 56, and 97 base pairs) between the human and mouse P_1-450 genes are found in the "TATA" box promoter region, -226, -338, and -450 upstream from the cap site, respectively. Nine genomic-DNA samples were digested with each of 23 restriction endonucleases and probed with human P_1-450 cDNA fragments. Restriction fragment length polymorphisms are detected, although it remains to be seen whether such a recombinant DNA test will be useful in determining individuals at increased risk for cigarette smoking-induced cancer and toxicity. (Auth. Abs. Mod.)

86–0362. Jongen, W.M.F.; Hakkert, B.C.; Van Der Hoeven, J.C.M. **Genotoxicity Testing of Cigarette-Smoke Condensate in the SCE and HGPRT Assays With V79 Chinese Hamster Cells.** *Food and Chemical Toxicology* 23(6):603-607, June 1985.

The genotoxicity of cigarette smoke condensate (CSC) was investigated using V79 Chinese hamster fibroblasts in the sister chromatid exchange (SCE) and hypoxanthine-guanine-phosphoribosyl-transferase (HGPRT) tests. CSC was negative in the SCE test both with and without metabolic activation (cocultivation with chick embryo primary hepatocytes). In the HGPRT test, no direct mutagenicity of CSC was observed; however, after metabolic activation there was a considerable increase in number of mutants. Comparison of different metabolizing systems showed that noninduced chick hepatocytes, liver homogenate from noninduced chick embryos, and liver homogenate from rats pretreated with Aroclor 1254 generated similar numbers of mutants in cells treated with CSC. In addition, the capacity of CSC to inhibit metabolic cooperation between V79 cells was studied. A dose-related increase in inhibition of metabolic cooperation was observed. Results suggest that the SCE test with V79 cells does not offer an adequate genetic endpoint for measuring the genotoxic properties of this complex CSC mixture. (Auth. Abs. Mod.)

86–0363. Kapur, S.; Pandav, C.S. **Predicting 24 Hour Metabolite Excretion From a Single Casual Urine Sample—A New Approach.** *Indian Journal of Pediatrics* 52(414):85-87, January-February 1985.

A new approach to predicting 24-hour metabolite excretion with acceptable results from a single casual urine sample is described. In the sample, the metabolite under study and creatinine are estimated and the ratio is calculated. The 24-hour creatinine excretion of an individual can be reliably computed from simple anthropometric indices such as weight or height, using equations for infants and adults. The equation for creatinine excretion/24 hours for infants is creatinine excretion/24-hour (mg/day)=(11.73 times body weight (kg))—3.631. Once 24-hour urinary creatinine excretion has been computed, the metabolite excretion/24 hours may be estimated: metabolite excretion/24 hours is equal to metabolite (estimated in casual urine sample) over creatinine (estimated in casual urine sample) multiplied by computed 24-hour creatinine excretion. Using this equation, an estimate of 24-hour excretion of the metabolite under study is derived independent of the individual's creatinine excretion, thus making comparisons in a cross-sectional study valid. This simple mathematical step eliminates the error, largely overlooked, when metabolites are expressed per unit quantity of creatinine, and makes the pooling of data more accurate and acceptable. An added advantage is that no 24-hour collection is required and the experimental protocol remains essentially unaltered.

86–0364. Kimmel, E.C.; Winsett, D.W.; Diamond, L. **Augmentation of Elastase-Induced Emphysema by Cigarette Smoke. Description of a Model and a Review of Possible Mechanisms.** *American Review of Respiratory Disease* 132(4):885-893, October 1985.

Elastase-induced emphysema was enhanced by exposure to whole cigarette smoke in rats (1) administered a single endotracheal dose of purified porcine pancreatic elastase (400 IU/kg), (2) exposed to undiluted cigarette smoke from Kentucky 2R1 reference cigarettes (one 35 mL puff/min for 10 min/day, 5 days/week for 12 weeks), or (3) treated with a combination of elastase followed by smoke exposure. Significant functional abnormalities observed in the lungs of rats receiving elastase included reduced spontaneous ventilation, enlarged subdivisions of lung volume, loss of elastic recoil, and diminished gas exchange capacity. Rats receiving both elastase and cigarette smoke had significantly more severe pulmonary dysfunction than did rats treated with elastase alone. Morphometric measurements of mean linear intercept demonstrated a loss of alveolar fine structure, with enlargement of distal air spaces in elastase-treated rats. Changes were significantly more severe in rats treated with both elastase and cigarette smoke. Pulmonary function tests and morphometric measurements in sham-treated rats and in rats exposed to cigarette smoke only were not significantly different from those in untreated control animals. (Auth. Abs.)

86–0365. Larsson, C.; Nordberg, A. **Comparative Analysis of Nicotine-Like Receptor-Ligand Interactions in Rodent Brain Homogenate.** *Journal of Neurochemistry* 45(1):24-31, July 1985.

The effects of incubation time, temperature, tissue protein content, and pH on interactions of various labeled nicotinic ligands with nicotine-like binding sites were studied in vitro in rodent brain preparations. Ligands tested were α-(^{3}H)bungarotoxin (α-(^{3}H)BTX), (^{3}H)tubocurarine ((^{3}H)TC), and (^{3}H)nicotine ((^{3}H)NIC). The regional distribution of the labeled nicotinic ligand binding was also studied, and affinity constants and maximal binding (B_{max}) values for the equilibrium (^{3}H)NIC binding are given. Association kinetics for (^{3}H)NIC and (^{3}H)TC binding to brain homogenate were similar, with maximal binding within 5 to 10 minutes of incubation, followed by a continuous decrease. In contrast, binding of α-(^{3}H)BTX to brain homogenate was much slower, reaching equilibrium after 30 to 60 minutes of incubation. Scatchard analysis of equilibrium binding data for (^{3}H)NIC in the hippocampus indicated two binding sites: a high-affinity site (B_{max}, 60 pmol/g protein; K_D, 6 nmol) and a low-affinity site (B_{max}, 230 pmol/g protein; K_D, 125 nmol). Data for the high-affinity (^{3}H)NIC binding site are similar to previous data for the high-affinity binding site of (^{3}H)TC and the binding site of α-(^{3}H)BTX. Ligands showed regional differences in binding, and binding patterns differed between ligands. (Auth. Abs. Mod.)

86–0366. Lundgren, K.; Lucier, G.W. **Differential Enhancement of Sister-Chromatid Exchange Frequencies by α-Naphthoflavone in Cultured Lymphocytes From Smokers and Non-Smokers.** *Mutation Research* 143(3):131-135, July 1985.

Sister chromatid exchange (SCE) frequency was assessed in peripheral lymphocytes from four smokers and eight nonsmokers in the absence or presence of α-naphthoflavone (ANF) in an attempt to determine if an SCE assay adaptation might more clearly differentiate smokers from nonsmokers. Mean SCE baseline frequencies were 8.05/cell in nonsmokers and 8.29/cell in smokers ($p=0.17$). ANF exposure produced significant increases in SCE frequencies, from 3.12 to 5.72/cell among smokers and from 0 to 1.96/cell among nonsmokers, that resulted in average ANF-induced SCE frequencies of 12.79 and 9.12/cell, respectively. Differences between smokers and nonsmokers were statistically significant after ANF exposure ($p=0.001$), as were increases within each group ($p=0.001$). A high degree of reproducibility of baseline and ANF-enhanced SCE frequencies was found within each individual over times ranging from a few weeks to several months. The mechanism responsible for the enhanced frequency of SCEs in smokers following ANF exposure is not clear, but may reflect changes in metabolic activation/deactivation or increased sensitivity to genetic effects of ANF.

86–0367. Marks, M.J.; Romm, E.; Bealer, S.M., et al. **A Test Battery for Measuring Nicotine Effects in Mice.** *Pharmacology Biochemistry and Behavior* 23(2):325-330, August 1985.

Genetic differences in nicotine effects in mice were confirmed, and measurement as part of a test battery yielded results identical to those obtained when each component was measured separately. Four inbred strains of mice (BALB, C57BL, DBA, and C3H) were subjected to a battery of tests consisting of respiration, startle response, Y-maze activity, heart rate, and body temperature measurements to assess the effects of nicotine. Strain differences in response to nicotine were not attributed to differences in metabolism or distribution of nicotine. Relative rank order of the strains to nicotine varied from test to test, suggesting that pharmacodynamic rather than pharmacokinetic differences underlie the strain differences in response to nicotine. Results obtained using the test battery were compared to those obtained with each test individually and no significant differences between results were found. Results confirmed that mouse genotype strongly influenced responses in several tests. (Auth. Abs. Mod.)

86–0368. Miner, L.L.; Marks, M.J.; Collins, A.C. **Relationship Between Nicotine-Induced Seizures and Hippocampal Nicotinic Receptors.** *Life Sciences* 37(1):75-83, July 1985.

To test the hypothesis that nicotine-induced seizures are regulated by hippocampal α-bungarotoxin (α-BTX) binding sites, experiments were carried out in mice derived from a classical F2 and backcross genetic design. Biochemical comparisons were made between seizure sensitive and insensitive animals to further characterize the α-BTX binding site. Mice of both sexes and all reciprocal matings from two backcross generations and the F2 generation were injected with nicotine (4.0 mg/kg i.p.) and observed for 3 minutes for signs of clonic seizure. These observations and brain tissue examinations revealed a relationship between nicotine-induced seizures and α-BTX nicotinic receptor concentrations. Mice sensitive to the convulsant effects of nicotine had greater α-BTX binding in the hippocampus than seizure insensitive mice. Binding sites from seizure sensitive and insensitive mice were equally affected by treatment with dithiothreitol, trypsin, or heat. It appears that the difference between seizure sensitive and insensitive animals may be due to a difference in hippocampal receptor concentration as measured with α-BTX binding. (Auth. Abs. Mod.)

86–0369. Minty, B.D.; Royston, D.; Jones, J.G. **Some Short-Term Effects of Changing to Lower Yield Cigarettes.** *Chest* 88(4):531-536, October 1985.

Results suggest that smokers can regulate intake of individual smoke constituents to maintain exposure. The rate of lung clearance of the hydrophilic tracer molecule ^{99m}Tc diethylenetriamine penta acetate (^{99m}Tc DTPA) was used to investigate the short-term effects on lung epithelial function in smokers who switched to lower yield cigarettes. Two separate studies were performed: (1) subjects smoked conventional mid- and low-tar cigarettes, and (2) subjects smoked two specially manufactured cigarettes with similar tar and nicotine yields, but differing carbon monoxide (CO) yields. Neither study demonstrated any significant improvement in ^{99m}Tc DTPA clearance. The yields of CO determined under standard machine smoking conditions implied that there would be a 44 percent reduction in exposure to CO when subjects switched from conventional mid-tar cigarettes to low-tar cigarettes. However, measurements of carboxyhemoglobin showed that smokers compensated for the lower yields and exposure was reduced by only 11 percent. With the special cigarettes, subjects reduced exposure by 7 percent instead of the expected 44 percent. However, urine measurements of nicotine and cotinine excretion indicated that there was no complimentary increase in nicotine absorption, suggesting the possibility that subjects may be able to regulate intake of individual components of cigarette smoke. (Auth. Abs. Mod.)

86–0370. Mohtashamipur, E.; Norpoth, K.; Lieder, F. **Isolation of Frameshift Mutagens From Smokers' Urine: Experiences With Three Concentration Methods.** *Carcinogenesis* 6(5):783-788, May 1985.

Frameshift mutagens were isolated and concentrated from cigarette smokers' urine using three different extraction methods: XAD-2 resin chromatography, chloroform, and blue cotton extraction systems. Extracts were then fractionated and tested for mutagenicity in the *Salmonella*/mammalian microsome test employing *Salmonella typhimurium* strain TA98. No clear dose—response relationship was observed between urine mutagenicity and the number of cigarettes smoked following extraction with XAD-2 resin; however, a fairly clear dose—response relationship was detected when urine samples were concentrated using the chloroform and blue cotton extraction methods. Using XAD-2 resin, no detectable mutagenic activity could be demonstrated when fewer than four cigarettes/day were smoked. Doubling of the spontaneous frameshift mutation frequency occurred when five cigarettes/day were consumed. Measurements of histidine residue in chromatography columns, chloroform extracts, and blue cotton extracts indicate the possibility of interference in mutagenicity assays to be unlikely. Urinary mutagenic activities were detected mainly from the second phase of the fraction, indicating the presence of four to five ring polycyclic aromatic hydrocarbons and other unknown compounds.

86–0371. Moldeus, P.; Berggren, M.; Grafstrom, R. **N-Acetylcysteine Protection Against the Toxicity of Cigarette Smoke and Cigarette Smoke Condensates in Various Tissues and Cells *In Vitro*.** *European Journal of Respiratory Diseases* 66(Supplement 139):123-129, 1985.

The protective effect of N-acetylcysteine (NAC) against tobacco smoke toxicity was investigated using different cellular in vitro systems and cigarette smoke condensates and nonvolatile and semivolatile condensate fractions. All three smoke condensate fractions were toxic to isolated rat hepatocytes and lung cells and caused loss of cell membrane integrity. Rapid depletion of cellular-reduced glutathione (GSH) preceded toxicity. Loss of GSH was the result of conjugation of reactive compounds in condensate fractions and not of oxidation, since no increase in oxidized glutathione was observed. A concentration of 1 mmol NAC protected from GSH loss and cell toxicity from condensate fractions. Effect of tobacco smoke condensate on colony-forming efficiency of cultured human bronchial cells showed that survival decreased to 40 percent of control at concentrations of 50 μg/mL, and almost no cells formed colonies at 100 μg/mL. NAC at 10 mmol substantially increased cell survival. (Auth. Abs. Mod.)

86–0372. Nagata, M.; Ishikawa, T.; Osumi, Y. **Effect of d-Nicotine on the l-Nicotine-Induced Increase in Gastric Acid Secretion in Rats.** *Japanese Journal of Pharmacology* 37(2):215-217, February 1985.

Intraventricular administration of 1,000 μg d-nicotine increased gastric acid secretion as did 5μg l-nicotine in rats anesthetized with urethane. Smaller doses of d-nicotine had no effect. However, when 50 μg d-nicotine was administered concomitantly with 5 μg l-nicotine, the l-nicotine-induced increase in gastric secretion was blocked. Both l- and d-nicotine induced a tonic convulsion, but pretreatment with d-nicotine inhibited the l-nicotine-induced convulsion. The relative potency of d-nicotine in inducing tonic convulsions was approximately 15 times less than that of l-nicotine. Results indicate that d-nicotine has both agonistic and antagonistic actions toward l-nicotine in the central nervous system, and that its agonistic potency varies with the preparation.

86–0373. Nagaya, T.; Toriumi, H. **Effects of Smoking on Spontaneous and Induced Sister Chromatid Exchanges in Lymphocytes.** *Toxicology Letters* 25(3):293-296, June 1985.

Effects of mitomycin C and smoking on spontaneous sister chromatid exchange (SCE) frequency in lymphocytes were analyzed in 24 nonsmokers and 24 sex- and age-matched smokers (5 to 40 cigarettes/day). Mean spontaneous SCE frequency was 9.8 SCEs/cell for nonsmokers and 11.5 SCEs/cell for smokers, which was statistically significant ($p<0.001$). However, no smoking effects on the sensitivities of lymphocytes to mitomycin C in vitro were observed. It is suggested that effects of mutagens in humans may be independent of one another. (Auth. Abs. Mod.)

86–0374. Nakayama, H.; Nakashima, T.; Kurogochi, Y. **Cytochrome P-450-Dependent Nicotine Oxidation by Liver Microsomes of Guinea Pigs. Immunochemical Evidence With Antibody Against Phenobarbital-Inducible Cytochrome P-450.** *Biochemical Pharmacology* 34(13):2281-2286, July 1985.

When guinea pigs were treated with phenobarbital (PB), the specific activity of liver microsomal nicotine oxidase increased by 42 percent. PB-inducible cytochrome P-450 (PB-P-450) was purified to homogeneity from liver microsomes of PB-treated guinea pigs. Purified PB-P-450 catalyzed nicotine oxidation when reconstituted with NADPH-P-450 reductase and phospholipid system. Antibody prepared against the purified PB-P-450 formed single precipitation lines with both purified PB-P-450 and microsomal components in livers of PB-treated guinea pigs, and both precipitation lines fused. The antibody against PB-P-450 strongly inhibited nicotine oxidation in the reconstituted system. The antibody also inhibited liver microsomal nicotine oxidase activities in PB-treated and untreated guinea pigs by about 30 percent and less than 5 percent, respectively. About 45 percent of total P-450 in liver microsomes of PB-treated guinea pigs was precipitated by the antibody. Results show that PB-P-450 participates microsomal nicotine oxidation in liver in PB-treated guinea pigs but not in untreated control animals. (Auth. Abs. Mod.)

86–0375. Nilsson, L.; Nordberg, A.; Beani, L., et al. **Effect of Nicotine and Cytisine on Acetylcholine Release From Cortical Slices of Guinea-Pig Brain.** *Acta Physiologica Scandinavica* 124(Supplement 542):217, 1985.

Data indicate that nicotine and cytisine (a nicotinic agonist) increased release of acetylcholine (^{3}H-ACh) from electrically stimulated cortical slices of guinea pig brain at low frequency of stimulation (0.2 Hz) and at low concentrations. Cytisine was about 10 times as effective as nicotine in enhancing ^{3}H-ACh release from slices of the cerebral cortex. ^{3}H-ACh release induced by nicotine ($2x10^{-6}$ to 10^{-4} mol) and cytisine ($5x10^{-7}$ to $6x10^{-5}$ mol) at a stimulation frequency of 0.2 Hz followed a linear dose—response curve. The dose—response curve shifted to the right with d-tubocurarine in the superfusion solution together with a different concentration of nicotine, indicating that ^{3}H-ACh release can be competitively prevented by tubocurarine. (Auth. Abs. Mod.)

86–0376. Oesch, F.; Bentley, P.; Golan, M., et al. **Metabolism of Benzo(*a*)pyrene by Subcellular Fractions of Rat Liver: Evidence for Similar Patterns of Cytochrome P-450 in Rough and Smooth Endoplasmic Reticulum But Not in Nuclei and Plasma Membrane.** *Cancer Research* 45(10):4838-4843, October 1985.

Using high pressure liquid chromatography, the benzo(*a*)pyrene (BaP) metabolites formed by rough and smooth endoplasmic reticulum, nuclei, plasma membrane, and mitochondrial fractions were studied. The metabolic profiles produced by the two most active fractions, smooth and rough endoplasmic reticulum, were very similar to each other but different from those produced by the other three preparations. The metabolite pattern produced by nuclear material differed slightly from that of endoplasmic reticulum, while plasma membrane and mitochondrial patterns differed markedly. Treatment of rats with trans-stilbene oxide or phenobarbital (1) increased the total amount of metabolites per protein mass and time, (2) changed the pattern of metabolites, but (3) induced a pattern of metabolites that was again very similar in rough and smooth endoplasmic reticulum. Treatment with 3-methylcholanthrene (3-MC) or β-naphthoflavone (1) preferentially induced the activity of rough endoplasmic reticulum, (2) changed the profile of metabolites, but (3) again did not disturb the similarities of the BaP metabolite pattern between both fractions. Selective inhibitors (metyrapone, α-naphthoflavone, tetrahydrofuran) had characteristically different effects on 7-ethoxycoumarin O-deethylase activity in preparations from untreated vs. trans-stilbene oxide (or phenobarbital)-treated vs. β-naphthoflavone (or 3-MC)-treated rats, but in any of these situations the effects of the selective inhibitors were similar in the smooth and rough endoplasmic reticulum fraction. Findings indicate that the composition of cytochrome P-450 isozymes is different in nuclei, plasma membrane, mitochondrial fractions, and the endoplasmic reticulum, but that the isoenzyme pattern of smooth and rough endoplasmic reticulum is similar even after enzyme induction. Analysis shows that the monooxygenase forms inhibited by α-naphthoflavone were major contributors to BaP metabolism in all fractions. No good correlation was found between dihydrodiol formation and epoxide hydrolase activity, indicating that epoxide hydration is not the rate-determining step in the formation of the dihydrodiols studied. (Auth. Abs. Mod.)

86-0377. Osman, M.; Cantor, J.O.; Roffman, S., et al. **Cigarette Smoke Impairs Elastin Resynthesis in Lungs of Hamsters With Elastase-Induced Emphysema.** *American Review of Respiratory Disease* 132(3):640-643, September 1985.

Desmosine formation and lysyl oxidase activity were monitored in smoke-exposed Syrian golden hamsters with elastase-induced emphysema to investigate the effect of cigarette smoke inhalation on the lung repair process and neosynthesis of cross-linked elastin. Following emphysema induction, test animals were allowed to recover in room air or were exposed to cigarette smoke for 6 to 8 minutes/hour, 8 hours/day, for 1 week. Smoke exposure effect on elastin resynthesis was evaluated by the severity of the elastase-induced lesion, elastin content, rate of cross-link formation, and lysyl oxidase activity. There was a 40 percent reduction of ^{14}C-lysine incorporation into the elastin-specific cross-links desmosine and isodesmosine in smoke-exposed test animals. There was also a decrease in the level of lung lysyl oxidase compared with levels in smoke-exposed, uninjured control animals, which was in sharp contrast to the sevenfold increase in lysyl oxidase activity observed in hamsters with elastase-induced emphysema recovering in room air. Findings suggest that impairment of lysyl oxidase production and resynthesis of cross-linked elastin by smoke inhalation exacerbates alveolar destruction. (Auth. Abs. Mod.)

86-0378. Pettersson, B.; Curvall, M.; Enzell, C. **The Inhibitory Effect of Tobacco Smoke Compound on Ciliary Activity.** *European Journal of Respiratory Diseases* 66(Supplement 139):89-92, 1985.

The embryo chicken trachea was used as an in vitro model to study the ciliotoxicity of the volatile part of the particulate phase of cigarette smoke condensate (CSC) and 11 phenols belonging to the semivolatile fraction. The particulate phase of CSC was divided into a semivolatile (SV) and a nonvolatile (NV) fraction. Toxicity of CSC, SV, and NV was approximately the same, producing ciliostasis within 21 to 28 minutes at a concentration of 1 mg/mL. The SV fraction, constituting 12 percent of the particulate phase, was further divided into four subfractions: acids, phenols, bases, and neutrals. The neutral fraction was more toxic than any of the other fractions ($p<0.001$), producing ciliostasis after 17 minutes at a concentration of 1 mg/mL. Least toxic was the basic fraction, which consisted mainly of nicotine. At a concentration of 3 mg/mL, the mean value for ciliostasis was 64 minutes. Alkylated phenols were more ciliotoxic than phenol. Toxicity was enhanced with increasing chainlength of the substituent (i.e., with increasing lipophilicity). It is suggested that identification of ciliotoxic and cytotoxic components of the SV fraction could lead to improved filters with the capacity to remove toxic compounds. (Auth. Abs. Mod.)

86-0379. Pittilo, R.M.; Nicholson, L.J.; Clarke, J.M.F., et al. **Cigarette Smoke-Induced Injury of Peritoneal Mesothelial Cells.** *British Journal of Experimental Pathology* 66(3):365-370, June 1985.

Exposure of cultured rat peritoneal mesothelial cells to plasma obtained from healthy adult male volunteers before and after smoking two medium-tar cigarettes (19 mg tar, 1.5 mg nicotine) revealed that factors toxic to these cells are present in human plasma following exposure to cigarette smoke. Rat mesothelial cells were chosen because they are closely related to endothelial cells and can be readily cultured. Little abnormality could be detected in mesothelial cells treated with presmoking plasma apart from occasional cell separation observed 20 hours after treatment. Appearance of cells following exposure to postsmoking plasma was considerably modified. Variation in extent of damage was observed up to 8 hours after treatment, but by 20 hours there was little variance between samples. Cells showed a tendency to "round-up" and be widely separated. Internally, various membrane abnormalities such as an increase in number of surface microvillus-like projections were observed. Large numbers of blebs on the plasma membrane were observed at 20 hours.

86-0380. Rice, J.E.; Coleman, D.T.; Hosted, T.J., Jr., et al. **Identification of Mutagenic Metabolites of Indeno(1,2,3*cd*)pyrene Formed *In Vitro* with Rat Liver Enzymes.** *Cancer Research* 45(11, Part 1):5421-5425, November 1985.

Indeno(1,2,3-*cd*)pyrene (IP) is a constituent of cigarette tar and a major environmental pollutant that is carcinogenic on mouse skin and in rat lung. Unlike benzo(*a*)pyrene, IP is a nonalternant polycyclic aromatic hydrocarbon that is devoid of a bay region. IP was mutagenic in *Salmonella typhimurium* TA100 strain in the presence of a 9000 x g supernatant from the livers of Aroclor-pretreated rats. Using a similar activation system, the major metabolites of IP were isolated and identified by comparison with synthetic reference standards. Among the metabolites formed in vitro are *trans*-1,2-dihydro-1,2-dihydroxy-IP, 8-, 9-, and 10-hydroxy-IP, 8- and 9-hydroxy-*trans*-1,2-dihydro-1,2-dihydroxy-IP, and IP-1,2-quinone. The 1,2-epoxide of IP is a potent direct-acting mutagen. While 8- and 9-hydroxy-IP were mutagenic with metabolic activation, 1-, 2-, and 6-hydroxy-IP and the *trans*-1,2-dihydrodiol had no significant mutagenic activity in *S. typhimurium* strain TA100 with metabolic activation. Data suggest that the K-region oxides of IP and of 8- and 9-hydroxy-IP are ultimately responsible for its mutagenic activity. (Auth. Abs.)

86-0381. Russell-Briefel, R.; Bates, M.W.; Kuller, L.H. **The Relationship of Plasma Carotenoids to Health and Biochemical Factors in Middle-Aged Men.** *American Journal of Epidemiology* 122(5):741-749, November 1985.

The relationship between plasma carotenoids and cigarette smoking, plasma cholesterol, vitamin supplement use, and intake of alcohol, vitamin A, and carotene was investigated in 187 men (35 percent smokers) participating at the Pittsburgh

Center of the Multiple Risk Factor Intervention Trial. Plasma carotenoid levels were found to be inversely associated with cigarette smoking ($r = -0.20$), serum thiocyanate ($r = -0.22$), weekly alcohol intake, and serum aspartate transaminase, and positively associated with dietary carotene index and dietary vitamin A index. Mean plasma carotenoid levels were higher in nonsmokers (186 µg/dL) than in smokers (164 µg/dL) and in vitamin A supplement users compared with nonusers (206 vs. 172 µg/dL, respectively). Among individuals not using vitamin A supplements, smokers had lower mean carotenoid levels than nonsmokers (156 vs. 180 µg/dL, respectively); however, in the group using supplements, levels in smokers and nonsmokers were similar (196 vs. 211 µg/dL). Variables associated with total plasma carotenoids in multiple regression analyses included dietary vitamin A and carotene, calorie intake, weekly alcohol intake, cigarette smoking, vitamin supplement usage, and plasma cholesterol, and accounted for 27 percent of the variance. (Auth. Abs. Mod.)

86–0382. Schechter, M.T.; Boyko, W.J.; Jeffries, E., et al. **The Vancouver Lymphadenopathy-AIDS Study: 4. Effects of Exposure Factors, Cofactors and HTLV-III Seropositivity on Number of Helper T Cells.** *Canadian Medical Association Journal* 133(4):286-292, August 15, 1985.

Cigarette smoking was found to have a significant effect on numbers of helper T cells in both seronegative and seropositive men who smoked, during testing for antibody to human T-lymphotropic virus (HTLV-III) and absolute numbers of helper T cells in 219 participants in the Vancouver acquired immune deficiency syndrome (AIDS) study. Among subjects who were seropositive for HTLV-III, smokers had an average of 696 helper T cells/mL whole blood compared with an average of 577 cells/mL in nonsmokers. The corresponding results for seronegative subjects were 967 and 784 helper T cells/mL whole blood, respectively. The cigarette smoking effect was statistically significant regardless of HTLV-III antibody status ($p = 0.001$). Overall, mean helper T cell counts were higher in seronegative than seropositive subjects ($p < 0.001$), and the number of established AIDS risk factors did not appear to have any effect on values independent of the effect of HTLV-III antibody status. Independent effects of a history of mononucleosis or hepatitis were noted, which indicated that viral agents may be cofactors in production of immune dysfunction.

86–0383. Schonheyder, H.; Moller-Hansen, C.; Andersen, P., et al. **Serum Antibodies to *Aspergillus fumigatus* in Danish Farmers.** *Sabouraudia: Journal of Medical and Veterinary Mycology* 23(2):93-99, April 1985.

Sensitization to *Aspergillus fumigatus* antigens appears to be determined by occupational exposure and smoking, according to a study of immunoglobulin G serum antibodies in 182 Danish farmers (40 percent smokers) and 105 city dwellers (62 percent smokers). Three purified antigen fractions and an unfractionated culture filtrate were investigated by enzyme-linked immunosorbent assay (ELISA). Farmers had higher levels of antibodies to all four ELISA antigens than nonfarming controls. High antibody activity was recorded in both farmers and controls with an antigen fraction of approximate molecular weight of 470,000 daltons. Antibody levels to this fraction were higher in nonsmokers than in smokers in both groups; however, the difference was not significant. Median antibody levels differed significantly between the smoking farmers and smoking controls, but not between nonsmokers in the two groups. Cattle farmers had higher antibody levels to the 470,000 dalton fraction than farmers with no animals. Farmers with higher antibody activity to any of the three fractionated ELISA antigens tended to have fewer respiratory symptoms than farmers with lower antibody activity. (Auth. Abs. Mod.)

86–0384. Schwartz, R.D.; Kellar, K.J. **In Vivo Regulation of (^{3}H)Acetylcholine Recognition Sites in Brain by Nicotinic Cholinergic Drugs.** *Journal of Neurochemistry* 45(2):427-433, August 1985.

In vivo regulation of (^{3}H)acetylcholine ((^{3}H)ACh) recognition sites on nicotinic receptors in rat brain was examined by administering drugs that increase stimulation of nicotinic cholinergic receptors, either directly or indirectly. After 10 days of treatment with the cholinesterase inhibitor diisopropyl fluorophosphate, (^{3}H)ACh binding in the cortex, thalamus, striatum, and hypothalamus was decreased. Scatchard analyses indicated that the decrease in binding in the cortex was due to a reduction in the apparent density of (^{3}H)ACh recognition sites. In contrast, after repeated administration of nicotine (5 to 21 days), the number of (^{3}H)ACh recognition sites was increased in the cortex, thalamus, striatum, and hypothalamus. Similar effects were observed in the cortex and thalamus following repeated administration of the nicotinic agonist cytisin. The nicotinic antagonists mecamylamine and dihydro-β-erythroidine did not alter (^{3}H)ACh binding following 10 to 14 days of administration. Further, concurrent treatment with these antagonists and nicotine did not prevent the nicotine-induced increase in these binding sites. Data indicate that (^{3}H)ACh recognition sites on nicotinic receptors are subject to up- and down-regulation and that repeated administration of nicotine results in a signal for up-regulation, probably through protracted desensitization at the recognition site. (Auth. Abs.)

86–0385. Shallom, J.M.; Katyare, S.S. **Altered Synaptosomal ATPase Activity in Rat Brain Following Prolonged *In Vivo* Treatment With Nicotine.** *Biochemical Pharmacology* 34(19):3445-3449, October 1985.

Prolonged in vivo treatment with nicotine altered synaptosomal ATPase activity in rat brain, according to a study employing doses of nicotine (0.02 and 0.04 mg/mL in drinking water) to simulate moderate and heavy smoking. A low dose of nicotine increased body weight, whereas a high dose inhibited weight gain. Examination of synaptosomal ATPase activities revealed a dose- and time-dependent stimulatory/inhibitory effect. With low dose of nicotine, maximum stimulatory effect on ATPase activity was seen at the end of the third week, while high dose stimulated enzyme activities maximally by the second week. Further treatment up to the fourth week caused inhibition of the ATPase activities (10 to 43 percent decrease). (Auth. Abs. Mod.)

86–0386. Shaskan, E.G.; Dolinsky, Z.S. **Elevated Endogenous Breath Acetaldehyde Levels Among Abusers of Alcohol and Cigarettes.** *Progress in Neuro-Psychopharmacology and Biological Psychiatry* 9(3):267-272, 1985.

Results indicate that the confounding effect of smoking limits the usefulness of endogenous breath acetaldehyde (AcH) analysis for early diagnosis of alcoholism and that endogenous AcH level elevations may represent a common factor associated with abuse of cigarettes and alcohol. The effects of alcohol and cigarette use on endogenous breath AcH levels were investigated in 15 alcoholic smokers, 16 alcoholic nonsmokers, 12 nonalcoholic smokers, and 14 nonalcoholic nonsmokers. All subjects abstained from alcohol for at least 3 days and fasted for 8 hours prior to breath sampling. Mean breath AcH levels were 25.1±2.1 ng/L for alcoholic smokers; 14.4±2.6 ng/L for alcoholic nonsmokers; 16.1±2.8 ng/L for nonalcoholic smokers; and 4.3±0.9 ng/L for nonalcoholic nonsmokers. Smokers, both alcoholic and nonalcoholic, had significantly higher mean AcH levels than nonsmokers ($p<0.0001$). Individuals classified as alcoholics had higher mean AcH levels than nonalcoholics ($p<0.0001$), regardless of smoking status. Evidence supports an additive effect of smoking and drinking on AcH levels: mean AcH value for alcoholic smokers was approximately 74 percent higher than values for alcoholic nonsmokers and 56 percent higher than for alcoholic smokers.

86–0387. Shimohama, S.; Taniguchi, T.; Fujiwara, M., et al. **Biochemical Characterization of the Nicotinic Cholinergic Receptors in Human Brain: Binding of (—)-(^{3}H)Nicotine.** *Journal of Neurochemistry* 45(2):604-610, August 1985.

Nicotine cholinergic receptors appear to be present in human brain and regional differences may exist in the density of these receptors. Studies have shown that (—)-(^{3}H)nicotine binds specifically to membranes of human brains (obtained at autopsy). Binding was stereospecific, (—)-nicotine being 40 times more potent than (+)-nicotine in displacing labeled (—)-nicotine. Saturation binding studies revealed presence of two binding sites with dissociation constant (K_D) values of 8.1 and 86 nmol, and maximum binding capacity (B_{max}) values of 36 and 90 fmol/mg protein, respectively. In competition studies, nicotinic agonists were 1,000 times more potent than ganglionic, neuromuscular, and muscarinic blocking drugs in displacing labeled (—)-nicotine. IC_{50} values for cholinergic drugs of (—)-(^{3}H)nicotine binding were as follows: (—)-nicotine, 0.51 nmol; acetylcholine, 12.6 nmol; (+)-nicotine, 19.9 nmol; cytisine, 27.3 nmol; and carbachol, 527 nmol. IC_{50} values of α-bungarotoxin, hexamethonium, δ-tubocurarine, and atropin were >50 µmol. In the brain regions tested, (—)-(^{3}H)nicotine binding was highest in the nucleus basalis of Meynert and thalamus and lowest in the cerebral cortex and caudate (Auth. Abs. Mod.)

86–0388. Sloan, J.W.; Martin, W.R.; Hook, R., et al. **Structure-Activity Relationships of Some Pyridine, Piperidine, and Pyrrolidine Analogues for Enhancing and Inhibiting the Binding of (±)-(^{3}H)Nicotine to the Rat Brain P_2 Preparation.** *Journal of Medicinal Chemistry* 28(9):1245-1251, September 1985.

The enhancement and inhibition of (±)-(^{3}H)nicotine binding in the rat brain P_2 preparation by a series of substituted pyridines, piperidines, and pyrrolidines that are structurally similar to the pyridine and pyrrolidine moieties of nicotine and related compounds were investigated. The ligands tested were found to vary greatly in ability to enhance nicotine binding. Drugs were identified that showed specificity for binding enhancement, while others inhibited but did not enhance binding. The 2-methyl congeners provided the most efficacious enhancement of nicotine binding, and (±)-2-methylpiperidine was the most specific drug studied. It enhanced binding in a dose-related way over a wide range of concentrations, but had little ability to inhibit binding. Several ligands were found that enhanced nicotine binding to some degree and inhibited binding by more than 100 percent; however, none bound with the very high affinity exhibited by nicotine and none could be classified as specific in inhibiting binding at a specific site.

86–0389. Sprince, H. **Protective Action of Sulfur Compounds Against Aldehyde Toxicants of Cigarette Smoke.** *European Journal of Respiratory Diseases* 66(Supplement 139):102-112, 1985.

Protectants against acetaldehyde, acrolein, and formaldehyde toxicants of cigarette smoke are reviewed, summarizing findings directed at a reexamination of aldehyde toxic and lethal effects and the search for a naturally occurring metabolite in the living intact animal. Protection studies were carried out with acetaldehyde by pretreatment with a high oral dose (2 mmol/kg) of L-cysteine and 17 other sulfur compounds. Eighty percent or more rats were protected with L-cysteine, N-acetylcysteine, thiamin HCl, sodium metabisulfite, L-cysteic acid, and a combination of L-cysteine, thiamin HCl, and L-ascorbic acid (CTA). N-acetylcysteine, L-cysteic acid, and CTA gave 100 percent protection (i.e., 100 percent survivors). With acrolein, protection data showed 80 percent survivors with L-cysteine and 95 percent with CTA. With formaldehyde, protection resulted in 20 percent survivors with L-cysteine and 55 percent with CTA. However, protection against formaldehyde lethality could be increased to 90 percent survivors by repeated dosing with L-ascorbic acid over a 2-day period prior to administration of formaldehyde. N-acetylcysteine proved to be a more effective protectant against acetaldehyde lethality than either L-cysteine or L-ascorbic acid alone on an equivalent mole basis, giving 100 percent protection in experimental tests with rats. (Auth. Abs. Mod.)

86–0390. Steenland, K.; Carrano, A.; Clapp, D., et al. **Cytogenetic Studies in Humans After Short-Term Exposure to Ethylene Dibromide.** *Journal of Occupational Medicine* 27(10):729-732, October 1985.

Smoking, but not ethylene dibromide (EDB) exposure, influenced frequency of sister chromatid exchanges (SCE) in sprayers (five smokers, one ex-smoker, eight never smokers) before and after exposure. A solution containing EDB is used during the summer in Colorado to kill pine beetles. Frequencies of SCEs and chromosomal aberrations were assessed in six nonexposed individuals. Full-shift personal breathing-zone air samples indicated that sprayers were exposed to an average of 60 ppb of EDB (8-hour time-weighted average). The range of exposure was from 5 to 281 ppb. Workers sprayed EDB for an average of 14 days during the summer. Exposure did not change average SCEs in nonsmokers (0.177 prior and 0.168 SCE/chromosome after spraying). A significant decrease occurred in smokers and the ex-smoker (0.223 before and 0.147 SCE/chromosome after spraying), which was not surprising because three of the five smokers reported a decrease in cigarette consumption over the summer due to the physically demanding nature of the work. The ex-smoker had quit only 5 months before. It is concluded that EDB exposure had no significant cytogenetic effects after smoking was accounted for.

86–0391. Steinman, G.D. **Salivary Thiocyanate in Smokers. (Letter).** *Journal of the American Medical Association* 254(10):1312, September 13, 1985.

Salivary thiocyanate was found to be a reliable index, within a reasonable margin of error, of the presence or absence of smoking habits, and also provided an estimate of the quantity smoked. In 100 randomly selected individuals, a semiquantitative color test on saliva (Smoke-Screen, threshold set at 500 mmol/L) gave a response that correlated with the number and brand of cigarettes smoked. With one exception, a total daily exposure of 60 mg tar or more yielded a positive reaction, while a lower dose gave a negative reaction. Although care must be taken to eliminate the dilutional effects of recent eating or other sources of discoloration, salivary thiocyanate has significant value in distinguishing smokers from nonsmokers.

86–0392. Stich, H.F.; Hornby, A.P.; Dunn, B.P. **A Pilot Beta-Carotene Intervention Trial With Inuits Using Smokeless Tobacco.** *International Journal of Cancer* 36(3):321-327, September 1985.

Beta-carotene appears to be an efficient inhibitor of micronuclei (MNC) in oral mucosa of snuff users who do not have a vitamin A deficiency and who have normal levels of retinol. Frequency of exfoliated cells with MNC was used to estimate the genotoxic effect of smokeless tobacco on oral mucosa and to follow response to beta carotene (three 30 mg capsules twice/week) in a pilot trial with Inuits in Gjoa Haven, Northwest Territories, Canada. The traditional Inuit diet (rich in caribou and seal meat and liver but low in vegetables and fruits) leads to normal serum levels of retinol (463 ng/mL in tobacco users and 447 ng/mL in nonusers) but low levels of beta-carotene (47 ng/mL and 57 ng/mL, respectively). Prior to administration of beta-carotene, frequency of MNC was 1.87±0.92 percent in mucosa of the lower gingival groove where tobacco is usually held. Following 10-week administration, MNC decreased significantly ($p<0.001$) to 0.74±0.42 percent. Frequency did not change significantly in the placebo group or in snuff users who received no treatment. Size and morphological appearance of typical snuff-related, whitish, wrinkled patches of mucosa in areas where tobacco was kept was not affected by treatment with beta-carotene. Similarly, no reduction was observed in frequency of anucleated, exfoliated mucosa cells. (Auth. Abs. Mod.)

86–0393. Swan, G.E.; Parker, S.D.; Chesney, M.A., et al. **Reducing the Confounding Effects of Environment and Diet on Saliva Thiocyanate Values in Ex-Smokers.** *Addictive Behaviors* 10(2):187-190, 1985.

Salivary thiocyanate analysis for corroborating self-reported smoking abstinence was evaluated in 391 adult ex-smokers who claimed abstinence from cigarettes for a minimum of 3 months. Results indicated the presence of significant thiocyanate confounders, such as using and inhaling nontobacco organic substances, working in a smoky environment (i.e., tobacco smoke), and consuming varieties of *Brassica oleracea* (e.g., cabbage), that could be identified and could be adjusted for to clarify classification of smoking status. Prior to adjustment, 18 percent of subjects had salivary thiocyanate values greater than the standard cutoff point of 100 μg/mL, which classified them as current smokers. After adjustment, only 12 percent had values over 100 μg/mL. Future epidemiological and clinical studies of smoking should use a formal dietary and environmental assessment to account for sources of variability in thiocyanate values. (Auth. Abs. Mod.)

86–0394. Tariq, M.; Parmar, N.S.; Ageel, A.M. **Effect of Nicotine and Caffeine Pretreatment on the Gastric Mucosal Damage Induced by Aspirin, Phenylbutazone, and Reserpine in Rats.** *Toxicology and Applied Pharmacology* 79(2):268-273, June 1985.

Pretreatment of rats with nicotine or caffeine alone or in combination resulted in significant augmentation of gastric ulcers produced by aspirin, phenylbutazone, and reserpine. Rats were given nicotine (2.5 mg percent), caffeine (30 mg percent base), or nicotine/caffeine combined (nicotine 2.5 mg percent, caffeine 30 mg percent) in drinking water ad libitum for 21 days and gastric mucosal damage induced by aspirin, phenylbutazone, and reserpine was determined. When given alone or concurrently, neither nicotine nor caffeine produced any visibly discernible gastric mucosal injury. However, pretreatment with caffeine produced less profound augmentation of experimentally induced gastric lesions than nicotine pretreatment. Enhancement of gastric ulcers in groups pretreated with nicotine and caffeine combined, followed by one of the drugs, was significantly greater than in groups treated with either nicotine or caffeine alone. The effect of nicotine on the mucus neck cell population of the gastric mucosa and on pancreatic bicarbonate secretion and the gastric secretory effect of caffeine may be responsible for the observed potentiation of the ulcerogenic effects of aspirin, phenylbutazone, and reserpine. (Auth. Abs. Mod.)

86–0395. Tegner, H.; Torelmalm, N.G. **Interaction Between N-Acetylcysteine and Cigarette Smoke Extract.** *European Journal of Respiratory Diseases* 66(Supplement 139):130-131, 1985.

N-acetylcysteine (NAC), a mucolytic drug, also appears to be a biological antioxidant with a protective function against the harmful effects of cigarette smoke components. Cigarette smoke extract inhibited mucociliary activity in rabbit trachea in vitro, reducing ciliary activity to zero after 60 minutes of incubation with an undiluted solution. Addition of NAC to cigarette smoke extract reduced the deleterious effect on mucociliary activity. Incubation with smoke extract containing 0 to 30 percent NAC produced a dose-related reduction of smoke-induced ciliostasis. A 2.5 percent concentration of NAC increased ciliary activity survival time from 1 to 2 hours; a 20 percent concentration preserved activity for up to 4 hours. Cigarette smoke produces a variety of morphologic changes in lung and respiratory tract mucosa and different components interact with normal function of mucociliary activity. (Auth. Abs. Mod.)

86–0396. Trell, L.; Korsgaard, R.; Janzon, L., et al. **Distribution and Reproducibility of Aryl Hydrocarbon Hydroxylase Inducibility in a Prospective Population Study of Middle-Aged Male Smokers and Nonsmokers.** *Cancer* 56(8):1988-1994, October 15, 1985.

Aryl hydrocarbon hydroxylase (AHH) inducibility was determined in a lymphoblast test system in 2,000 consecutive middle-aged male smokers, 304 ex-smokers, and 218 never smokers in the same birth-year cohorts. Intraindividual, intraobserver, interobserver, and temporal reproducibility was checked in a special double-blind quadruplet sample series from 20 other middle-aged men. Results showed a three-modal phenotype distribution of AHH inducibility with high (fold induction ≥ 3.6), intermediate (2.6 to 3.6), and low (≤ 2.5) levels ranging from 7.6 to 10.5, 38.5 to 43.0, and 46.5 to 53.9 percent, respectively, in all smoking categories. The reproducibility of the measurements was excellent, with one-way variance in the order of 0.007 to 0.033. The applied assay method can be used in large-scale prospective population investigations as required to establish a cause—effect association between high AHH inducibility and smoking-related malignancies of the respiratory tract and oral cavity. (Auth. Abs. Mod.)

86–0397. Tucker, D.F.; Oliver, R.T.D.; Travers, P., et al. **Serum Marker Potential of Placental Alkaline Phosphatase-Like Activity in Testicular Germ Cell Tumours Evaluated by H17E2 Monoclonal Antibody Assay.** *British Journal of Cancer* 51(5):631-639, May 1985.

Assays of placental-like alkaline phosphatase (PLAP) showed that serum PLAP increased with cigarette consumption. PLAP was evaluated as a serum marker of testicular germ cell tumors, using H17E2 monoclonal antibody in a solid-phase localization of enzyme activity (ILEA). Single or repeated assays were performed on serum samples from 213 normal blood donors and on a smaller number of term pregnancy and testicular cancer sera. The detection limit of PLAP was 0.14 O.D. units. Of 50 patients with metastatic disease, 88 percent of 16 with seminoma, 54 percent of 13 with mixed seminoma and malignant teratoma, and 33 percent of 21 with malignant teratoma had serum PLAP$>$0.2 O.D. units, compared with 2 percent in nonsmokers, 17 percent in ex-smokers, and 29 percent in smokers free of disease for more than 12 months. In 15 of 22 successfully treated patients, pretreatment serum PLAP exceeded 0.2 O.D. units (mean 0.69 O.D.) and varying (53 to 97 percent) reductions in the initial levels occurred with treatment. Results suggest that measurement of PLAP levels will be useful in management of patients with germ cell tumors, particularly seminoma, although its use will be limited in those with a history of smoking. (Auth. Abs. Mod.)

86–0398. Voisin, C.; Aerts, C.; Fournier, E., et al. **Acute Effects of Tobacco Smoke on Alveolar Macrophages Cultured in Gas Phase.** *European Journal of Respiratory Diseases* 66(Supplement 139):76-81, 1985.

Tobacco smoke had cytotoxic effects on alveolar macrophages (AM) of guinea pigs (evaluated from a decrease in ATP content) with total smoke appearing to be more toxic than gas phase smoke. The investigation of short-term effects of tobacco smoke on AM used a culture technique in gaseous phase that permitted direct contact between cells and the atmosphere without any liquid interposition. Gas phase smoke toxicity was also determined by electron microscopy and by a decrease in cell bactericidal activity. With exposure to smoke from five cigarettes, total smoke appeared more toxic (cytotoxicity index$=46.7\pm 13.6$) than gas phase (cytoxicity index$=3.2\pm 14.2$) ($n=11$, $p<0.01$). Large variation in AM susceptibility is not related to cell content in superoxide dismutase, but seems to be in correlation with AM glutathione content, especially when cells are cultured with N-acetylcysteine. However, the protective glutathione action is not total and seems less important than that observed with low concentration of nitrogen dioxide (0.2 ppm/24 hours). AM in gas phase culture is a new approach to the study of smoke effects on cells, enabling identification of cytotoxic components for analysis of biological mechanisms involved in macrophage response and for evaluation of cell protective methods. (Auth. Abs. Mod.)

86–0399. Wanner, A. **A Review of the Effects of Cigarette Smoke on Airway Mucosal Function.** *European Journal of Respiratory Diseases* 66(Supplement 139):49-53, 1985.

In healthy smokers and smokers with chronic bronchitis, data indicate that (1) cigarette smoke produces structural and functional abnormalities in the airway mucociliary system; (2) short-term exposure to cigarette smoke causes ciliostasis in vitro, but has inconsistent effects on mucociliary function in man; (3) long-term exposure produces impairment of mucociliary clearance associated with epithelial lesions, mucus hypersecretion, and ciliary dysfunction; (4) the particulate and gas phases of cigarette smoke are ciliotoxic; and (5) impairment of mucociliary clearance in healthy cigarette smokers may be reversible after cessation of smoking. Hypersecretion of mucus, possibly with altered rheologic properties, and of periciliary fluid by inflammatory mediators (such as leukotrienes) may contribute to smoke-induced impairment of mucociliary interaction and mucus clearance. However, functional disturbances produced by inflammation appear to represent only one component of cigarette smoke-induced mucociliary dysfunction, considering the direct ciliotoxic effects and the extensive morphologic lesions in airway epithelium produced by cigarette smoke. (Auth. Abs. Mod.)

See also **86–0504, 86–0525**

MORTALITY AND MORBIDITY

86–0400. Benfante, R.; Reed, D.; Brody, J. **Biological and Social Predictors of Health in an Aging Cohort.** *Journal of Chronic Diseases* 38(5):385-395, 1985.

Elderly men who remained healthy and free of disease smoked the fewest cigarettes during 12-year followup in a study of over 5,000 men (aged 46 to 69) to determine factors associated with remaining free of major chronic diseases. Nonhealthy individuals who developed stroke and coronary heart disease (CHD) had the highest consumption level (25 percent higher than the healthy group). Approximately 1,600 disease-free men were compared with 3,400 who developed CHD, stroke, cancer, or a variety of other conditions. Bivariate and multivariate analyses showed several biological and lifestyle variables, in addition to age, that were inversely associated with maintenance of health. In general order of relative statistical strength, the variables were blood pressure, cigarette smoking, body mass index, alcohol consumption, serum triglycerides, uric acid, and glucose. Forced vital capacity was directly associated with maintenance of health. Of the variables, blood pressure was the strongest discriminator between healthy status and all categories of disease; cigarette smoking and alcohol consumption were the next most important factors. It is suggested that use of individuals who remain free of disease as a standard for health can facilitate evaluation of risk factors for both total illness and a broad range of specific chronic diseases in a single population. (Auth. Abs. Mod.)

86–0401. Burch, P.R.J. **Cigarette Smoking and Mortality Rates. (Letter).** *Journal of Chronic Diseases* 38(6):469-470, 1985.

An earlier commentary (*Journal of Chronic Diseases* 37(5):325-332, 1984) is defended, noting that the long-term rise in lung cancer incidence and mortality rates was not attributed to genetic factors. It had not been suggested that shifts in gene frequencies account for mortality trends, but rather that genes help predispose to smoking. Also, changes in the impact of environmental factors such as viruses are responsible for much of the change in mortality. In addition, it is claimed that the regression equation used for incremental respiratory cancer mortality rates conflicts with mortality ratios observed in case—control and prospective studies. Further, the scatter of points around the regression line is not considered random enough for the linear regression analysis to be valid. See also 84-1702.

86–0402. Grossarth-Maticek, R.; Bastiaans, J.; Kanazir, D.T. **Psychosocial Factors as Strong Predictors of Mortality From Cancer, Ischaemic Heart Disease and Stroke: The Yugoslav Prospective Study.** *Journal of Psychosomatic Research* 29(2):167-176, 1985.

The relationship between smoking and mortality from cancer, ischemic heart disease, and stroke was investigated in a prospective study of 1,353 inhabitants of Crvenka, Yugoslavia, 619 of whom died between 1966 and 1976. Age-standardized analysis confirmed the greatly increased risk of lung cancer in smokers ($p < 0.001$) and also indicated a significant increase in risk of other cancers ($p < 0.01$) and in total mortality ($p < 0.05$) than in nonsmokers. A relatively weak nonsignificant association was observed between smoking and ischemic heart disease. A negative relationship with stroke was evident ($0.01 < p < 0.05$). Significant positive trends between the number of cigarettes smoked and lung cancer, ischemic heart disease, and total mortality were observed. Standardizing data for the psychosocial risk factor of rationality and antiemotionality (R/A) reduced the smoking/lung cancer association, virtually eliminated the smoking/other cancer and smoking/heart disease relationships, and reduced an observed association between heart disease and blood cholesterol, blood sugar, and hypertension. It is concluded that psychosocial variables are important predictors of mortality and decisively modify the effect of physical risk factors such as smoking.

86–0403. Keys, A.; Karvonen, M.J.; Punsar, S., et al. **HDL Serum Cholesterol and 24-Year Mortality of Men in Finland.** *International Journal of Epidemiology* 13(4):428-435, December 1984.

No significant difference in serum levels of high density lipoprotein cholesterol was found between smokers and nonsmokers, and smoking habits were not significantly related to coronary mortality; however, a highly significant death rate from all causes was found for smokers compared with nonsmokers. Examinations of healthy men in Helsinki and in rural west and east Finland in 1956 included estimation of total cholesterol with HDL and beta fractions separated by electrophoresis. Over the 24 years, 155 of 526 men, aged 35 to 61, died (63 from coronary disease), while in the 30 to 34 age group, 36 of the original 261 men died (16 from coronary disease). All causes and coronary death rates were highest in east Finland where HDL cholesterol was also the highest. Coronary death rates were not related to HDL cholesterol in east or west Finland, but 16 men who died from coronary heart disease in Helsinki tended to have low HDL values. Probability of 24-year coronary death was not significantly related to HDL, but was significantly and positively related to non-HDL cholesterol concentration. HDL and total serum cholesterol mean values for men of the same age in the same area in Finland, with lipoprotein separation by new recommended methods, agree closely with the means recorded in 1956. The 24-year findings are not necessarily in conflict with literature reports on an inverse relationship between coronary heart disease incidence and HDL cholesterol based on shorter followup periods and less mortality data. (Auth. Abs. Mod.)

86–0404. Kristein, M.M. **Cigarette Smoking and Mortality Rates. (Letter).** *Journal of Chronic Diseases* 38(6):471-473, 1985.

In an ongoing exchange of views on the relationship of cigarette smoking with disease and mortality, a criticism is made of what are viewed as sophisticated abuses of scholarship used in a concurrently published letter (*Journal of Chronic Diseases* 38(6):469-470, 1985). Data from several studies are used to refute the assertion that diagnostic error is a key factor in explaining the long-term rise in lung cancer mortality in England and Wales. The misuse and distortion of references and data and the insistence on perfection are emphasized. While still insisting that genes predispose to smoking and are associated with those that help to determine the rate of progression of heart disease, the latest claim is that changes in the impact of one or more environmental precipitators, such as viruses, are the main problem. It is agreed that some smokers appear to be much more susceptible than others and that this may reflect genetic factors, but in the case of respiratory cancers, the overwhelmingly important environmental agent would appear to be smoking. The misuse of data from the MRFIT report and other examples of what are called "straw man" attacks on the evidence against smoking are described. See also 86-0401.

86–0405. Pinsky, J.L.; Branch, L.G.; Jette, A.M., et al. **Framingham Disability Study: Relationship of Disability to Cardiovascular Risk Factors Among Persons Free of Diagnosed Cardiovascular Disease.** *American Journal of Epidemiology* 122(4):644-656, October 1985.

The relationship between physical disability and cardiovascular risk factors including smoking, hypertension, body mass index, cholesterol, and diabetes was evaluated in 2,021 original participants in the Framingham Heart Study who were free of diagnosed cardiovascular disease at 27-year followup (between 1976 and 1978). Number of cigarettes smoked/day was calculated using data from previous biennial examinations. Following stratification of subjects according to sex and age group, long-term smoking was significantly related to disability only among women aged 65 to 74 years ($p<0.05$). Overall, long-term and current hypertension, body mass index, and diabetes were associated with disability. Among men, only long-term hypertension was related to disability. Since the study group consisted of individuals who survived and avoided diagnosed cardiovascular disease, selection effects may play some role in any observed association or lack of association, and any relationship, or lack thereof, should be regarded with caution.

86–0406. Ravenholt, R.T. **Tobacco's Impact on Twentieth-Century U.S. Mortality Patterns.** *American Journal of Preventive Medicine* 1(4):4-17, 1985.

The number of lung cancer deaths in the United States during this century exceeds two million, and the total number of deaths attributable to tobacco probably exceeds 10 million. Because of the leading role of the United States in the production, promotion, and use of cigarettes, tobacco-related mortality is highest in this country, where tobacco is now an environmental hazard almost equal to all other preventable hazards to life combined. Using the city of Seattle's death records to ascertain lung cancer trends before 1950, only sporadic deaths were observed up to 1930. Male lung cancer deaths increased rapidly thereafter, rising to 40.8/100,000 population at risk in 1960. Beginning in 1960, lung cancer deaths among both males and females climbed rapidly. Using Hammond's matched pair analysis (number of deaths from specified causes during 34 months among 36,975 men who never smoked regularly and 36,975 men smoking >20 cigarettes/day), a lung cancer index to total smoking-related mortality estimated 250,000 excess deaths in 1962, 300,000 in 1966, and 485,000 in 1980. The medical and scientific community can help stop the tobacco epidemic by (1) recognizing smoking as the world's most widespread and destructive form of addiction; (2) understanding that inhaling smoke exposes the entire body to circulating mutagens and accelerated malignant cellular evolution; (3) prohibiting smoking in every hospital, clinic, and medical school; (4) routinely ascertaining the lifetime smoking experience of every patient; and (5) routinely certifying the role of tobacco in premature deaths of smokers. (Auth. Abs. Mod.)

86–0407. Stemmermann, G.N.; Heilbrun, L.; Nomura, A., et al. **Late Mortality After Partial Gastrectomy.** *International Journal of Epidemiology* 13(3):299-303, September 1984.

A 10-year prospective study of 407 Japanese men living in Hawaii with partial gastrectomy shows that age-adjusted mortality rates were slightly higher than for men with intact stomachs. The excess is attributed in part to increased smoking by men with stomach ulcers, although the difference failed to achieve statistical significance. Death due to stroke and lung cancer, which showed the most substantial deviations, can be attributed only in part to the tendency of men with these diseases to be smokers. Other factors, possibly related to nutrition, also contribute to increased risk of mortality from these diseases. Death from coronary heart disease, an illness with substantial association with smoking in men with an intact stomach, was less frequent in men with gastrectomy (difference not statistically significant). It appears that men with partial gastrectomy had other characteristics that weakened the impact of smoking upon coronary disease risk, e.g., low blood pressure, low serum cholesterol, low body weight, and increased alcohol consumption. (Auth. Abs. Mod.)

See also **86–0417, 86–0424, 86–0431, 86–0487**

NEOPLASTIC DISEASES

86–0408. Adelhardt, M.; Moller Jensen, O.; Sand Hansen, H. **Cancer of the Larynx, Pharynx, and Oesophagus in Relation to Alcohol and Tobacco Consumption Among Danish Brewery Workers.** *Danish Medical Bulletin* 32(2):119-123, May 1985.

To determine the role of tobacco, beer, and strong liquors in the development of upper aerodigestive tract cancer among members of the Danish Brewery Workers Union, a case—control study was conducted among workers who developed cancer of the pharynx, larynx, or esophagus during the years 1943 through 1972. An analysis based on information obtained retrospectively from hospital records and by means of a mailed, self-administered questionnaire for patients or their relatives showed an increased relative risk of developing an upper aerodigestive cancer with increasing tobacco consumption. Combined risk was 1.9 times higher among heavy smokers than among light smokers or nonsmokers. The positive trend with increasing tobacco consumption was significant for esophageal cancers ($p=0.05$). An increasing relative risk was also found with increasing daily alcohol consumption, an association that was significant for esophageal cancer and for all cancers combined. The association was found only for daily beer consumption, supporting the hypothesis that heavy beer intake may be a risk factor in cancer development. (Auth. Abs. Mod.)

86–0409. Andreasson, L.; Bjorlin, G.; Laurell, P., et al. **Oral and Oropharyngeal Cancer, Aryl Hydrocarbon Hydroxylase Inducibility and Smoking. A Follow-Up Study.** *ORL Journal for Oto-Rhino-Laryngology and Its Borderlands* 47(3):131-138, 1985.

Smokers with high aryl hydrocarbon hydroxylase (AHH) levels run a sixfold risk of developing cancer and of developing it earlier in life than people with low or intermediate AHH levels. AHH inducibility and smoking habits were studied in 40 men and 10 women (41 smokers) with oral or oropharyngeal malignancies. All patients had histopathologically verified squamous cell cancer. AHH levels of patients, classified as high, intermediate, or low, were compared with levels in 118 healthy controls, similarly grouped. Significant overrepresentation of patients with high AHH level ($p<0.0005$) and underrepresentation of low AHH levels ($p<0.01$) was found. In the high AAH group, 25 of 26 patients were smokers. In the intermediate and low AHH groups, 8 of the 12 patients in each group were smokers. Recurrences or secondary malignancies in the upper digestive tract or airways were substantially higher in the high AHH group. It is concluded that high AHH inducibility level is both pathogenetically and prognostically important in oral and oropharyngeal cancer. (Auth. Abs. Mod.)

86–0410. Bolis, A.J. **Oral Cancer.** *Dental Assisting* 4(3):16-18, 20, January 1985.

Tobacco use, heavy alcohol consumption, and poor dentition independently increase the risk of oral cancer. Oral cavity cancers are affected by the swallowing of tar and exposure to tobacco smoke. Laboratory studies and animal experiments have shown that carcinogenic activity is aggravated by cigar and pipe smoke, in addition to that of cigarettes. Cigar smoke has been found to contain numerous chemical components that are also found in cigarette smoke, and concentrations of tumorigenic agents are equal to or in excess of those found in cigarette tar. Long-term exposure to chemical carcinogens in tobacco and trauma from heat and drying generated by cigarette smoking significantly increase development of mouth cancer. Prolonged use of chewing tobacco and snuff may lead to benign, premalignant, and malignant lesions of the base of the tongue and the buccal mucosa. Habits that involve prolonged holding of unburned tobacco directly against the tissue in one area of the mouth may produce a local concentration of the chemical components of tobacco, resulting in changes in mucous membrane. The relative risk of oral cancer in women who are heavy drinkers (>1 oz alcohol/day) and smokers (>20 cigarettes/day) is 18 times greater than for women who neither drink nor smoke. Recently, a synergistic effect has been suggested for alcohol and tobacco smoking. Oral cancer detection methods are outlined. (Auth. Abs. Mod.)

86–0411. Boyko, R.W.; Cartwright, R.A.; Glashan, R.W. **Bladder Cancer in Dye Manufacturing Workers.** *Journal of Occupational Medicine* 27(11):799-803, November 1985.

Smoking had little relationship with bladder cancer incidence among chemical dye workers in West Yorkshire, England. Results showed that workers in dyestuffs industries who were exposed to aromatic amines still experience a detectable increased risk of bladder cancer many years after the control of hazardous arylamines. Although the risk of bladder cancer has peaked, workers exposed to arylamines still experience a twofold to threefold increased risk even after adjustments for age and smoking. Data were analyzed for 2,389 men (cases and controls). Because smoking is recognized as a risk factor, data were stratified by age and smoking status (percentages for cases and controls are given). In men under 60 years of age, relative risk (RR) in smokers was 2.31 compared with 2.04 among nonsmokers; at ages 60 to 69, RR was 3.16 for smokers and 3.35 for nonsmokers; and over 69 years of age, RR was 2.41 for smokers and 2.80 for nonsmokers. RR for age only was 2.22, 3.26, and 2.62, respectively. Overall RR was 2.62 for age only, and 2.60 for age and smoking combined. A dose—response relationship was demonstrated, linked to the number of years of occupational exposure. (Auth. Abs. Mod.)

86–0412. Conney, A.H.; Kappas, A. **Interindividual Differences in the Metabolism of Xenobiotics.** In: Huberman, E.; Barr, S.H. (Editors). *The Role of Chemicals and Radiation in the Etiology of Cancer.* Carcinogenesis—A Comprehensive Survey, Volume 10, New York, Raven Press, 1985, pp. 147-166.

Current research supports the hypothesis that components of cigarette smoke, particularly the polycyclic aromatic hydrocarbons (PAH), may convey a stimulatory effect on metabolism of xenobiotics, contributing to interindividual differences in biotransformation of environmental carcinogens to reactive and nontoxic metabolites in man. PAHs have a marked stimulatory effect on benzo(*a*)pyrene (BaP) hydroxylase activity in the placenta and maternal liver, lung, and intestine in rats. Increased monooxygenase activity was also found in fetal liver, indicating that enzyme inducers in cigarette smoke pass through the placenta. BaP hydroxylase activity has been found to vary from about sixfold to about eightyfold, respectively, among placentas from nonsmokers and smokers. Additional studies reveal that cigarette smokers have shorter plasma half-lives of phenacetin, antipyrine, theophylline, and caffeine than nonsmokers. Since enzyme induction by PAHs enhances in vivo metabolism of xenobiotics in experimental animals, it is considered likely that cigarette smokers have an altered toxic response to some environmental xenobiotics. This may help explain individual differences in the sensitivity of people to the carcinogenic action of these chemicals.

86–0413. Cooper, E.H.; Pidcock, N.B.; Jones, W.G., et al. **Evaluation of an Amplified Enzyme-Linked Immunoassay of Placental Alkaline Phosphatase in Testicular Cancer.** *European Journal of Cancer and Clinical Oncology* 21(4):525-530, April 1985.

Smoking induced a significant rise of serum placental alkaline phosphatase (PLAP) in controls in a testicular cancer study, with a median level of 0.055 U/L in nonsmokers compared with 0.25 U/L in smokers. Serum PLAP levels were examined in 81 male controls, 51 patients with untreated testicular tumors (41 seminomas and 10 nonseminomatous testicular tumors), and 34 patients in complete remission (11 seminoma and 23 nonseminoma). PLAP levels found in those with pretreatment seminoma (median 1.7 U/L) were significantly higher than in those with untreated teratoma (median 0.7 U/L). Treatment produced a significant decline in PLAP levels for patients with seminomas in remission (median 0.07 U/L). The role of PLAP in routine monitoring of seminomas was evaluated in 17 patients studied for 1 to 4 years. PLAP shows similar trends to human chorionic gonadotrophin, but is an independent variable. Testing for PLAP will help in monitoring response to treatment and verify that there are no unexpected foci of tumor, but the influence of smoking must be considered in evaluating test results. (Auth. Abs. Mod.)

86–0414. Enterline, P.E.; Keleti, G.; Sykora, J.L., et al. **Endotoxins, Cotton Dust, and Cancer.** *Lancet* 2(8461):934-935, 1985.

Deaths from all causes, all cancers, and respiratory cancer with standardized mortality ratios (SMRs) observed in white male cotton textile workers appear to confirm that cancer deaths are considerably lower in workers heavily exposed or exposed for long periods than in workers lightly exposed to cotton dust. SMRs for cancer were consistently lower than SMRs for all causes, contrasting with most epidemiological studies of occupational groups that show higher SMRs for cancer than for other causes, especially cardiovascular disease. Of particular interest were low SMRs for respiratory cancer observed in some studies and the inverse relationship between SMRs and the degree of exposure in one study and the duration of exposure in another. Among reasons suggested for low cancer mortality are that textile workers employed in a potentially explosive vegetable dust environment are not permitted to smoke and that cancer mortality rates reflect a lower than average proportion of smokers. Unfortunately, studies do not include smoking data. Cotton-dust exposure may stimulate mucus production, protecting against cigarette smoke carcinogens, and endotoxins in cotton dust may inhibit growth of lung cancer cells. It is suggested that if small airborne doses of endotoxins inhibit growth of cancer cells, it might be possible to introduce some substance into cigarette filters to help reduce the cancer risk from smoking. (Auth. Abs. Mod.)

86–0415. Fei, S-Z.; Wang, R-G.; Wang, C-R., et al. **Dynamic Analysis of Increasing Frequency of Laryngeal Cancer.** *Chinese Medical Journal* 98(4):289-291, April 1985.

Smoking was closely associated with laryngeal cancer in a 30-year study of 1,605 patients in Shenyang, China. Depicted as one of the most common malignancies, laryngeal cancer was found to be increasing at a rapid rate. Data for 1953 to 1955, 1963 to 1965, and 1973 to 1975 revealed that the number of patients diagnosed with laryngeal cancer in the 1970s was 37.7 times greater than in the 1950s. Among 100 patients seen between July 1979 and 1980, 97 had a history of smoking (89.7 percent >20 years). Only 29 had a history of alcohol use. In 1974, the number of female patients almost equaled that of men. The high incidence in women is attributed to smoking; female laryngeal cancer patients exceeded men in three Chinese provinces and 94 percent had a history of smoking (>20 years). The supraglottic region and the epiglottic laryngeal surface were most frequently affected by the disease. (Auth. Abs. Mod.)

86–0416. Garfinkel, L.; Auerbach, O.; Joubert, L. **Involuntary Smoking and Lung Cancer: A Case—Control Study.** *Journal of the National Cancer Institute* 75(3):463-469, September 1985.

The risk of lung cancer for women married to men who smoked ≥40 cigarettes/day or who were exposed at home to smoke of >20 cigarettes/day was twice as high as that of women not exposed to smoke. Risk ranged from 13 to 31 percent in women exposed to smoke of others in a case—control study conducted from 1971 to 1981 in four hospitals. The 134 cases of lung cancer and 402 colon-rectum cancer cases used as controls were identified in nonsmokers and confirmed by histologic review. Nonsmoking status and exposures were verified by interview. Odds ratios (OR) increased with increasing number of cigarettes smoked by the husband, particularly for cigarettes smoked at home. OR for women whose husbands smoked ≥20 cigarettes/day at home was 2.11. Logistic regression analysis showed a significant positive trend of increasing risk with increased exposure to the husband's smoking at home, controlled for age, hospital, socioeconomic class, and year of diagnosis. Comparison of women classified by number of hours/day exposed to smoke in the last 5 years and in the last 25 years showed no increase in lung cancer risk, possibly because the exposure by hour variable does not accurately measure intensity of exposure. (Auth. Abs. Mod.)

86–0417. Geddes, M.; Osmond, C.; Barchielli, A., et al. **Analysis of Trends in Cancer Mortality in Italy 1951-1978; The Effects of Age, Period of Birth, and Period of Death.** *Tumori* 71(2):101-110, April 1985.

Tobacco use, alcohol consumption, and birth rates were compared with mortality trends in Italy between 1951 and 1978 for six cancer sites: esophagus, lung, breast, cervix/uterus, testis, and bladder. Mortality trends, analyzed according to age, period of birth, and period of death, were related to similar analyses in England and Wales. For lung cancer, curves constructed for period of death, age at death, birth cohort, and tobacco use show substantial increases. The cohort curve is much steeper for men than for women, reflecting historical differences in cigarette consumption. Recent stability in cohort lung cancer rates probably reflects a trend toward smoking of low-tar and filter cigarettes. Among smokers in 1965, 49 percent of men and 80 percent of women used filtered cigarettes compared with 6 and 15 percent, respectively, in 1957. However, caution must be used in interpreting the data, since cigarette consumption trends relate to time periods only, combining information about many age groups.

86–0418. Guyatt, G.H.; Newhouse, M.T. **Are Active and Passive Smoking Harmful? Determining Causation.** *Chest* 88(3):445-451, September 1985.

A method for establishing causation is applied to evidence on smoking as a cause of lung cancer in adults and parental smoking as a cause of respiratory illness and decreased pulmonary function in children. A series of diagnostic tests determine the strength and consistency of the association, whether the appropriate temporal relationship and dose—response gradient have been established, and whether the association makes biologic sense. Eight prospective studies of smoking and lung cancer that consistently demonstrated a strong relationship have confirmed the temporality of the association and demonstrated a dose—response gradient. Studies addressing passive smoking effects in children are consistent in suggesting increased infections for those less than 1 year of age, but neither increased risk nor a dose—response gradient is found consistently in older children. Rules for assessing causation can be used to integrate new information concerning the health hazards of smoking. (Auth. Abs. Mod.)

86–0419. Jamrozik, K. **Smoking and Lung Cancer. (Letter).** *Medical Journal of Australia* 42(7):428, April 1985.

In an ongoing debate on the relationship between smoking and lung cancer, the assertion that statistical association alone can never constitute evidence of causation is not questioned; however, three indisputable facts that link smoking and lung cancer are presented. First, the incidence of lung cancer (bronchogenic carcinoma) is related to smoking habits: cigarette smokers experience an excess of lung cancer and incidence of lung cancer in a community is closely correlated with cigarette consumption in that community. Moreover, when an individual (or community) stops smoking, risk (or rate) of lung cancer falls. Second, when animals are induced to smoke, or cigarette tar is painted on their skin, tumors develop. Finally, benzopyrenes (proven carcinogens present in cigarette smoke) have been shown to bind to cellular DNA, laying the groundwork for incorrect bases to be incorporated during replication or transcription of genetic material. It has been proved beyond a reasonable doubt that smoking causes lung cancer, and the only listeners to arguments to the contrary are the tobacco companies.

86–0420. Journal of the American Dental Association. **Preventing Oral Cancer.** *Journal of the American Dental Association* Special Issue (Guide to Dental Health):19-20, 1985.

In addition to other diseases, smokers are at risk for developing cancer of the mouth and throat. About 9,000 people die each year of oral cancer, and the risk in smokers is five times that of nonsmokers. Risk of oral cancer cannot be diminished by switching from cigarettes to pipes, cigars, chewing tobacco, or snuff. The practice of holding tobacco in one place in the mouth often produces leukoplakia (a hardened white lesion) that is considered precancerous. Three to five percent of leukoplakias progress to oral cancer. Alcohol consumption is also a risk factor for oral cancer, and combined intake of tobacco and alcohol further exacerbates the risk. Other less well-established risks include poor dental health, inadequate diet, low socioeconomic status, and employment in the textile industry. Risk increases with age and is higher among males. Early stages are painless, and symptoms are often ignored. However, if not diagnosed early, treatment may require extensive surgery after which normal appearance and function of the mouth cannot be restored. A procedure for self-examination for oral cancer is explained.

86–0421. Kato, I.; Ogawa, H.; Tominaga, S. **Multiple Primary Cancer and Its Risk Factors in the Aichi Cancer Registry.** *Japanese Journal of Clinical Oncology* 15(Supplement 1):255-264, April 1985.

Smoking, especially heavy smoking (>30 cigarettes/day), may be a risk factor for multiple primary cancers. To study risk factors for multiple primary neoplasms, 265 cases (with 490 cancers) were compared with 1,412 cases of single cancers, matched for sex, age, year of diagnosis, and site of cancer using data of the Aichi Cancer Registry from 1962 to 1983. In male heavy smokers (≥30 cigarettes/day) relative risk was 2.17, in particular for multiple primary cancers including lung cancer. In females, relative risk for drinkers and daily drinkers was 2.02 and 4.22, respectively. Relative risk was highest for beer drinkers. Some occupations were related to increased or decreased risk of multiple primary cancers, especially in males. Data on family history suggest both genetic predisposition and environmental similarity among family members. Three characteristics of multiple primary cancer were revealed: a higher percentage of cancer in two or more members of the family; a higher percentage of cancer in sisters; and a higher percentage of family history of colorectal cancer. These differences were statistically significant and more pronounced in females. (Auth. Abs. Mod.)

86–0422. Khanna, A.K.; Khanna, N.N. **Some Observations on Oral Cancer.** *Indian Journal of Medical Sciences* 39(2):23-26, February 1985.

Oral cancer in India, which is most common among Hindu males of low socioeconomic status, occurs primarily in tobacco chewers. In one study of 216 patients with mouth cancer (aged 20 to 80 years, male to female ratio 10.9:1), 80 percent had chewed Khaini (tobacco with lime) or Zarda (tobacco with betel) six to seven times/day for an average of 15.8 years, and 30 tended to keep the quid overnight in the gingivolabial or gingivobuccal sulcus, the most frequent cancer sites. Only 30 patients were exclusively cigarette or bidi smokers; 56 both smoked and chewed tobacco. The most common type of growth encountered was ulcerative. Leukoplakic patches were present in 52 cases (24.7 percent). Cancers were found more often in the vestibule of the mouth (74 percent) than in the oral cavity (26 percent). Only four patients had double cancers. Most (98 percent) cases were identified by radiographic examination as squamous cell carcinoma. The study was conducted at the Varanasi University Hospital between 1976 and 1980.

86–0423. La Vecchia, C. **Patterns of Cigarette Smoking and Trends in Lung Cancer Mortality in Italy.** *Journal of Epidemiology and Community Health* 39(2):157-164, June 1985.

Cigarette consumption has been increasing steadily throughout this century in Italy, and marked increases have been recorded for three periods: the 1920s, the 1950s (possibly owing to the spread of smoking among young men), and the 1970s (in part as a result of smoking among women). The average number of cigarettes/adult/day sold legally in 1980 was 6.9, but when smuggling is taken into account, the actual average number of cigarettes smoked/day is likely to range between eight and nine. Data from a national sample-based survey conducted in 1980 showed that smoking prevalence in men was broadly similar within age groups, geographical area, education, and socioeconomic groups. Among women, however, smoking was concentrated among younger and more educated women living in larger towns and in richer areas of the country. This pattern is typical of a recent rapid spread of smoking among women. No material increase in lung cancer mortality in young women was evident up to the late 1970s. Lung cancer death rates in men correlated closely with observed changes in cigarette consumption. The highest mortality rates (about 7/100,000, 20/100,000, and 50/100,000 in age groups 35 to 39, 40 to 44, and 45 to 49, respectively) were reached by the generation born around 1927 to 1930. Rates have remained fairly constant for those born up to 1940. As a consequence, Italian lung cancer death rates in middle-aged men (45 to 54) are currently the highest in developed countries, and large upward trends are currently detectable in older men. (Auth. Abs. Mod.)

86–0424. La Vecchia, C.; Decarli, A. **Trends in Cancer Mortality in Italy, 1955-1978.** *Tumori* 71(3):201-218, May-June 1985.

Data on cancer mortality among Italians from 1955 to 1978 showed that total cancer deaths among men increased in all age groups; however, when respiratory and other tobacco-related neoplasms were excluded, death rates were roughly stable up to age 64. Moderate decreases in overall cancer mortality at younger ages (35 to 44) have been apparent since the early 1970s. In women, all age-specific and age-standardized rates decreased; downward trends were more pronounced (-18.5 percent) in younger women (35 to 44 years). Respiratory cancer mortality increased sharply in males: lung cancer deaths reached a plateau in the early 1970s in the 35 to 44 age group, but increased in all subsequent ages. In women, the increase in lung cancer mortality was about 50 percent in those aged 45 to 54 and 55 to 64, but no upward trend was evident in younger women. Rates for other tobacco-related cancers (mouth or pharynx, larynx, esophagus, pancreas, kidney, and bladder) also increased. In both sexes, gastric cancer mortality dropped about 50 percent below age 65, but mortality rates from stomach cancer were still considerably higher than in other Western countries. Mortality from cancer of the cervix decreased markedly, mostly in younger age groups. Upward trends in death rates were evident for cancers of the breast in women and cancer of the bowel; however, trends have leveled off since the late 1960s. (Auth. Abs. Mod.)

86–0425. Marin Trigo, J.M.; Candel Calderon, M.; Sebastian Arino, A., et al. **Cancer de pulmon (I). Epidemiologia. Clinica. Radiologia. [Tumors of the Lung (I). Epidemiology, Clinical and Radiographic Features.]** *Revista Clinica Espanola* 176(5):237-242, March 1985, Spanish.

Habitual smoking and lung cancer were significantly associated (predominantly among males) in a 2-year study on epidemiological, clinical, and radiographic features of 253 lung tumors fulfilling previously established criteria. Most patients (mean age 63 years; 94 percent male and 6 percent female) were habitual smokers (88.5 percent smoked an average of 30 cigarettes/day). Only 6.3 percent were passive smokers. Previous contact with known carcinogens was established in 14 percent; 51 percent had chronic bronchitis. General symptoms were more common than pulmonary symptoms. Cancer types were squamous cell carcinoma, 59.5 percent; undifferentiated small cell carcinoma, 15.4 percent; adenocarcinoma, 13.9 percent; giant cell carcinoma, 5.5 percent; and other rare types, 5.5 percent. Radiographic signs of metastasis are analyzed for each histologic type of tumor. (Auth. Abs. Mod.)

86–0426. Olsen, J.; Sabreo, S.; Fasting, U. **Interaction of Alcohol and Tobacco as Risk Factors in Cancer of the Laryngeal Region.** *Journal of Epidemiology and Community Health* 39(2):165-168, June 1985.

The combined effect of alcohol consumption and tobacco use was found to be a multiplicative rather than an additive risk factor in a Danish study of newly diagnosed laryngeal cancer patients, aged 75 and under, conducted from 1980 to 1982. Synergism was found in all exposure combinations except in moderate consumers of alcohol and tobacco. The case—control study consisted of 326 cases and 1,134 age- and sex-matched controls. Information on tobacco use and alcohol consumption was obtained from questionnaires. The male to female ratio for laryngeal cancers (191 glottis, 111 supraglottis, 24 infraglottis, and some not classified) was 5:5, except for cancers of the supraglottis (24:5). Among patients, 81 percent of smokers inhaled the smoke compared with 69 percent of controls ($p < 0.01$). For cancer of the supraglottis, only a very moderate increased risk was seen for nonsmokers with moderate alcohol consumption. More cancer patients, regardless of cancer site, reported beer as the most frequently consumed alcoholic beverage. Alcohol consumption and tobacco use were found to be important risk factors for all laryngeal cancers and for the subgroups of cancer of the glottis and supraglottis. (Auth. Abs. Mod.)

86–0427. Pershagen, G. **Lung Cancer Mortality Among Men Living Near an Arsenic-Emitting Smelter.** *American Journal of Epidemiology* 122(4):684-694, October 1985.

Data from 212 male lung cancer cases and 424 controls in northern Sweden suggest that arsenic exposure and smoking are synergistic lung cancer risks. Data on smoking habits, occupation, and residence were obtained from next of kin. Subjects were classified as miners, smelter workers, exposed (living within 20 km of a large copper smelter but not occupationally exposed), or referent (living >20 km from a copper smelter and not occupationally exposed). Controlling for smoking habits, smelter workers and miners had relative risks for lung cancer of 3.0 and 4.1, respectively. A relative risk of about 2.0 was observed among both nonsmokers and smokers in exposed subjects compared with reference subjects, but only the excess in smokers was significant. The interaction between risk due to residence in the exposed area and smoking habits significantly exceeded an additive level, indicating a possible synergistic effect.

86–0428. Phillips, B.; Marshall, M.E.; Brown, S., et al. **Effect of Smoking on Human Natural Killer Cell Activity.** *Cancer* 56(12):2789-2792, December 1985.

A marked depression in natural killer (NK) cell activity was found in smokers that was comparable with that found in lung cancer patients. It is suggested that smoking-induced alterations in NK activity may play a role in the pathogenesis of smoking-related lung cancer. Peripheral blood NK activity was measured in 22 nonsmokers, 15 light/moderate smokers (≤ 49 pack years, mean 26.7), 12 heavy smokers (≥ 50 pack years, mean 79.0), and 19 patients with lung cancer (≥ 40 pack years, mean 71.0). Patients with lung cancer had marked depression in NK activity compared with nonsmokers. When considered as a single group, smokers had lower NK activity (29.5 ± 23.8 percent) than nonsmokers (43.4 ± 17.3 percent, $p < 0.02$). However, when grouped according to smoking intensity, light/moderate smokers had NK activity comparable to that of nonsmokers (41.3 ± 22.9 percent). NK activity in heavy smokers was 14.7 ± 15.7 percent, significantly lower than that of light smokers ($p < 0.002$). Mean NK activity for patients with lung cancer was 19.3 ± 13.7 percent, significantly different from that of nonsmokers ($p < 0.001$) and light smokers ($p < 0.0015$), but not significantly different from heavy smokers. (Auth. Abs. Mod.)

86–0429. Polak, J. **Proskpektivni Studie Plicni Rakoviny u Hospitalizovanych Nemocnych. I. Zakladni Udaje o 618 Nemocnych. [Prospective Investigation of Lung Cancer in Hospitalized Patients. I. Basic Data on a Group of 618 Patients.]** *Casopis Lekaru Ceskych* 124(31):977-981, 1985, Czech.

Of 618 lung cancer patients in a tuberculosis and respiratory disease hospital between 1975 to 1977, 93.6 percent with bronchogenic carcinoma were smokers; of these, 88.6 percent had smoked more than 100,000 cigarettes. Proportion by type were squamous cell carcinoma, 69.1 percent; small cell carcinoma, 15.1 percent; adenocarcinoma, 9.4 percent; large cell carcinoma, 4.2 percent; and undefined types, 2.2 percent. There were 578 men and 40 women; 2.1 percent were under 39 years of age, 19.3 percent between 40 and 49 years, 34.6 percent between 50 and 59 years, 31.5 percent between 60 and 69 years, and 12.5 percent were 70 years and older. Tuberculosis was present in 17.1 percent, pneumonia in 27.3 percent, and chronic bronchitis in 23.9 percent. In 74.8 percent of cases, patients went to see a doctor because of complaints; in 25.2 percent the disease was discovered during preventive examinations. Most frequent manifestations were fever, influenza-like symptoms, cough or deterioration of cough, expectoration, chest pain, and hemoptysis. Most frequent symptoms at time of hospital admission were cough or deterioration of cough, expectoration, dyspnea, chest pain, hemoptysis, loss of weight, and fatigue. (Auth. Abs. Mod.)

86–0430. Samet, J.M. **Lung Cancer, Smoking and Diet in Hispanic Women of the United States.** In: Vivo, P. (Editor). *1984 National Hispanic Heritage Week. Hispanic Women's Health Issues.* Proceedings of a Conference, Rockville, Maryland, September 11, 1984. U.S. Department of Health and Human Services, Public Health Service, Hispanic Employee Organizations and the Office of the Assistant Secretary for Health, Office of Equal Employment Opportunity, 1984, pp. 37-46, 53-56.

Results of a case—control study and a literature review show that lung cancer in Hispanic women is largely attributable to cigarette smoking and that further etiological study seems unnecessary. In the early 1950s, the lung cancer rate in Hispanic women was two to three times that of Anglo women. By the early 1970s, the rate in Hispanic women had dropped to only 60 percent of that of non-Hispanic white women. Older Hispanic women had much higher smoking rates, had started smoking at a younger age, had used hand-rolled cigarettes for an average of 8.8 years, and were all Mexican born. However, recent surveys of younger Hispanic (American-born) women showed that only 20 percent smoked, most consumed < 1.0 pack/day, and few had ever used hand-rolled cigarettes. Consumption of total vitamin A, retinol, and carotene was significantly higher in Hispanics. However, neither diet nor ethnicity appeared to influence lung cancer risk. It is concluded that the current low prevalence of smoking in Hispanic women should be encouraged and reduced even further. A commentary on study results is included.

86–0431. Statistical Bulletin. **Differences in Breast and Lung Cancer Mortality in the United States.** *Statistical Bulletin* 66(4):12-17, October-December 1985.

Lung cancer mortality among white women increased rapidly after World War II, while breast cancer deaths rose only slightly. Female lung cancer mortality will continue to increase as women who began smoking during the 1940s grow older, and rates for lung cancer will soon overtake those for breast cancer. Mortality data for lung and breast neoplasms in white women aged 35 to 74 are compared on a state-by-state basis for the years 1979 through 1981. Lung cancer mortality is lowest in Utah (18.7/100,000), reflecting the Mormon proscription of tobacco use. Nevada women have the highest mortality (58.1/100,000). The national average for female lung cancer mortality is currently 42.0/100,000. The geographic distribution of breast cancer differs from that of lung cancer, reflecting a different etiology. The national average death rate for breast cancer is 51.5/100,000 women and is lowest (40.2/100,000) in Arkansas and highest (63.0/100,000) in the District of Columbia. Breast cancer mortality increased steadily with age, while lung cancer mortality rose dramatically up to age 65 and leveled off in 65- to 74-year-olds (mostly nonsmokers).

86–0432. Tajima, K.; Tominaga, S. **Dietary Habits and Gastro-Intestinal Cancers: A Comparative Case-Control Study of Stomach and Large Intestinal Cancers in Nagoya, Japan.** *Japanese Journal of Cancer Research* 76(8):705-716, August 1985.

Cigarette smoking increased the risk of stomach cancer ($RR = 1.99$, not significant), but decreased the risk of colon cancer ($RR = 0.61$, not significant) in a case—control investigation of dietary habits and gastrointestinal cancers in Nagoya, Japan. Patients, including 93 with stomach cancer and 93 with colorectal cancer, were compared with 186 controls. Among male current smokers, the Brinkman Index showed a positive dose—response relationship to stomach cancer but an inverse relationship to colon cancer. Relative risk among current cigarette smokers who began smoking before 20 years of age was 3.96 for stomach cancer ($p < 0.05$). Carcinogenic agents in cigarettes may cause cancer in the upper respiratory and digestive tracts, but nicotine may act as an indirect protective factor against colon cancer by stimulating bowel movement and shortening transit time of stools, thus tending to reduce exposure time to carcinogenic or promoting agents in stools. Since smoking is known to be an important risk factor for common adult diseases, e.g. cardiac diseases and chronic respiratory diseases, and smoking-associated cancers, it is suggested that smokers might die from noncancerous fatal disease before developing cancer. (Auth. Abs. Mod.)

86-0433. Tashiro, T.; Nasu, M.; Goto, J., et al. **Lung Cancer Complicated by Silicosis: A Clinical and Histopathological Study.** *Japanese Journal of Medicine* 24(1):3-7, February 1985.

An 8-year clinicopathological study of 16 male lung cancer cases complicated by silicosis suggests that carcinogenesis was induced by smoking in 14 patients who had a Brinkman index of more than 500 (mean 740). At time of diagnosis, 12 had advanced clinical stage III and IV tumors, underscoring the difficulty of early detection of lung cancer in silicosis patients. Patients, aged 47 to 72 years, had been exposed to dust with silica in tunnels or coal mines for 7 to 24 years. Only one patient was a nonsmoker. Tumors, found in all lobes of the lung, were mainly epidermoid or undifferentiated carcinoma, with very few adenocarcinomas. Two cases were thought to be scar carcinomas. It is suggested that early detection of lung cancer in silicosis patients, particularly those in high-risk groups over the age of 40 and with a Brinkman index of more than 500, can be aided by bronchofiberscopy, detailed analysis of chest roentgenograms, and frequent cytological examination of sputum. (Auth. Abs. Mod.)

86-0434. Wang, L-D.; Hammond, E.C. **Lung Cancer, Fruit, Green Salad and Vitamin Pills.** *Chinese Medical Journal* 98(3):206-210, March 1985

Lung cancer deaths among cigarette smokers who ate fruit and drank fruit juice 5 to 7 days/week were lower than among smokers who ate fruit or drank fruit juice 0 to 2 days/week in an American Cancer Society study of 1,000,000 subjects. Consumption of green salad and vitamin pills, however, showed no relationship to lung cancer death rates. Mortality ratios for men who ate fruit 5 to 7 days/week, 3 to 4 days/week, and 0 to 2 days/week were 1.00, 1.23, and 1.75, respectively. A slight positive association between smoking habits and fruit consumption among men who smoked from 20 to 39 cigarettes/day was observed. For all age groups combined, the observed vs. expected number of lung cancer deaths in smokers of 20 to 39 cigarettes/day were 639/723.3 (5 to 7 days/week), 161/162.1 (3 to 4 days/week), and 321/235.5 (0 to 2 days/week), with corresponding mortality rates of 1.00, 1.12, and 1.54, respectively. Thus, fruit consumption by smokers may provide some protection against lung cancer. However, taking vitamin pills had little protective effect on lung cancer risk. It is suggested that consuming pills containing vitamins A and C does not substitute for eating fruit or drinking fruit juice.

86-0435. Weiss, N.S. **Can *Not* Smoking Be Hazardous to Your Health?** *New England Journal of Medicine* 313(10):632-633, September 5, 1985.

A study (*New England Journal of Medicine* 313(10):593-596, September 5, 1985) that found a reduced risk of endometrial cancer in postmenopausal women who smoke may provide a lead for identifying means of preventing endometrial cancer. Smoking confers a small protection against this tumor (about a 30 percent risk reduction, or 6 lives saved/100,000 smokers/year). However, since the number of lives lost due to smoking is 30 times higher, the risk—benefit ratio of smoking is not significantly improved. It is noted that the negative association between smoking and endometrial cancer is consistent with the effect of smoking on other estrogen-related phenomena. Endometrial cancer incidence increases with estrogen use, while smoking is associated with a reduction in incidence only among postmenopausal women, regardless of estrogen use. This suggests that smoking probably influences risk through the metabolism of estrogens or the way they act on endometrial cells rather than via the production of estrogens. See also 85-0085.

See also **86-0459, 86-0497, 86-0646, 86-0647**

NON—NEOPLASTIC RESPIRATORY DISEASES

86-0436. Cohen, B.S.; Harley, N.H.; Tso, T.C. **Clearance of Polonium-210-Enriched Cigarette Smoke From the Rat Trachea and Lung.** *Toxicology and Applied Pharmacology* 79(2):314-322, June 1985.

Areas of accumulated α radioactivity were found on samples of larynx from rats exposed to smoke from cigarettes enriched with polonium-210 (^{210}Po). Female Fischer rats (n=48) were exposed daily for 6 months to smoke from cigarettes with 500 times the normal content of ^{210}Po and distribution and clearance of α radioactivity were measured. Control rats (n=48) were exposed to standard cigarette smoke. Animals were serially withdrawn and killed with subsequent necropsy of the trachea, major bronchi, larynx, and nasopharynx. No other local accumulations were seen on the airways. Lower lungs were analyzed radiochemically for ^{210}Po. Both radiochemical analysis and track measurements showed highly elevated activity concentrations in rats exposed to ^{210}Po-enriched cigarettes. Following withdrawal from smoke exposure, both short- and long-term clearance components were seen. Parameters that fit the postexposure data for clearance of the lung burden cannot fit the buildup during the exposure period. The short time period and limited number of animals tested preclude direct extrapolation of results to human smokers. (Auth. Abs. Mod.)

86–0437. Colebatch, H.J.H.; Greaves, I.A. **Chronic Airflow Obstruction. Evolution of Disordered Function in Cigarette Smokers.** *Medical Journal of Australia* 142(11):607-610, May 27, 1985.

Recently developed lung measurements that reflect lung structure were used to study the evolution of chronic airflow obstruction in male cigarette smokers and subjects with pulmonary emphysema. The exponent K, from a single exponential function fitted to static pressure-volume data, is an index of lung distensibility directly related to the size of peripheral airspaces. Elastic recoil pressure is inversely related to K. Conductance measured during forced and interrupted deflations of the lungs reflects the dimensions of airways. K increased abnormally with age in smokers, suggesting an increase in airspace size caused by cigarette smoke, which probably acts by intensifying elastase activity in lung tissue. Decreased conductance (implying narrowing of airways) is found in young smokers, but conductance increases and airways become more distensible in older smokers. Progressive increase in K (with decrease in recoil pressure) and decrease in conductance are responsible for severe airflow obstruction in cigarette smokers. (Auth. Abs. Mod.)

86–0438. Demuth, P.J. **Clove Cigarettes: A Hazardous Fad.** *American Journal of Nursing* 185(9):950-951, September 1985.

It is possible that 12 cases of severe illness and one death can be linked to smoking clove cigarettes, a hazardous fad increasingly popular on the West Coast and among young people. Clove cigarettes, imported from Indonesia, contain 60 to 70 percent tobacco and 30 to 40 percent ground cloves, clove oil, and other additives. A typical tobacco cigarette contains from 0.8 to 1.2 mg of nicotine/cigarette; a clove cigarette has 2.75 mg of nicotine/cigarette, twice the tar of some cigarettes and 30 to 40 times the tar of low-tar cigarettes. Users of clove cigarettes have reported hemoptysis, nosebleeds, sore throats, frequent upper respiratory infections, dyspnea, nausea, and vomiting. Inhalation of smoke from clove cigarettes numbs the upper airway, owing to the anesthetic effects of eugenol (the active ingredient in cloves), and suppresses the cough reflex, making inhalation more tolerable, especially to first-time smokers. The anesthetic also permits deeper inhalation. Chest x rays of people adversely affected by clove cigarettes show interstitial lung disease, consolidation, or pulmonary edema. Patients also exhibit signs of anaphylaxis from allergic sensitivity, or aspiration pneumonia from an anesthetized pharynx and tracheobronchial tree. (Auth. Abs. Mod.)

86–0439. Finucane, K.E.; Greville, H.W.; Brown, P.J.E. **Irreversible Airflow Obstruction. Evolution in Asthma.** *Medical Journal of Australia* 142(11):602-604, May 27, 1985.

The presence and degree of irreversible airflow obstruction was found to be independent of cigarette smoking and childhood onset of disease in 89 asthma patients (51 never smokers, 26 ex-smokers, 12 current smokers) who received intensive theophylline therapy for 4 weeks. Of these, 48 patients with forced expiratory volume in 1 sec (FEV_1) <85 percent of predicted received additional treatment with prednisolone. Mean FEV_1 values increased with treatment from 77 to 90 percent of predicted normal. Mean difference between predicted normal and highest FEV_1 during treatment was 0.29 L ($p<0.001$) overall; 0.42 L ($p<0.001$) in 51 never smokers, and 0.22 L ($p<0.05$) in those with adult onset of asthma. There was a correlation between duration and severity of asthma and FEV_1 values that was not influenced by smoking habits, and it is concluded that asthma alone can cause irreversible airflow obstruction. It must be determined how asthma interacts with cigarette use and other factors in development of obstruction.

86–0440. Foster, W.M.; Langenback, E.G.; Bergofsky, E.H. **Disassociation in the Mucociliary Function of Central and Peripheral Airways of Asymptomatic Smokers.** *American Review of Respiratory Disease* 132(3):633-639, September 1985.

To determine if mucus transport of peripheral and central airways is altered by smoking, techniques using the inhalation and deposition of radioactive particles (Fe_2O_3 spheres tagged with ^{99M}Tc) followed by gamma camera imaging were used with eight smokers and eight nonsmokers with similar expiratory volumes. Using 24-hour particle retention and planar distribution of particles in the chest as indexes of peripheral and central deposition, the two groups were found to have similar deposition patterns. Mucus clearance of particles was quantitated as the interval between initial deposition and the time required to attain 75, 50, and 25 percent retention levels. Six of the smokers had 75 percent retention times comparable to those of the nonsmokers, but the 50 and 25 percent retention times differed significantly between the two groups ($p<0.025$). Among smokers, the intervals to attain 25 and 50 percent retention levels were 60 to 90 percent greater than the mean values observed for nonsmokers. Velocity of mucus streaming within stem bronchi was comparable for the two groups; β_2-adrenergic stimulation increased mucus transport in smokers to the baseline control rates of nonsmokers. Data suggest that reduced mucociliary function of asymptomatic smokers, apparent in the later stages of particle retention, represents altered mucus flow from peripheral airways. (Auth. Abs. Mod.)

86–0441. Fournier-Massey, G.; Massey, D.G.; Price, S., et al. **Tropical Island Asthma in Hawaii.** *Annals of Allergy* 55(3):479-483, September 1985.

Irritants such as tobacco and volcanic smog were among the major loading factors contributing to tropical island asthma in Hawaii. Questionnaire data completed by 76 asthmatics in a residential area and by 204 asthmatics attending emergency rooms established a profile of variations associated with ethnicity, time in Hawaii, and prescribing habits. The commonest trigger of asthma was infection followed by emotion, allergy (danders, pollen, and house dust), and irritants, particularly tobacco, exhaust fumes, and volcanic smog (vog). Tobacco, among other irritants, emerged in the major loading factors constituting 30 percent of 30 demographic, clinical, environmental, and therapeutic variables. It is suggested that Hawaii's increased morbidity and mortality from tropical island asthma be further examined in terms of ethnicity, infection, house dust, and prescribing habits. (Auth. Abs. Mod.)

86–0442. Fryksmark, U. **Myeloperoxidase Activity in Smokers; An Additional Factor in the Development of Pulmonary Emphysema.** *European Journal of Respiratory Diseases* 67(2):81-83, August 1985.

Recent findings show that some smokers have increased activity of the heme-enzyme myeloperoxidase (MPO) in peripheral blood and lung neutrophils and that MPO influences α_1-protease inhibitor (α_1PI) activity. Neutrophils release MPO during phagocytosis. Concentration-dependent inactivation of α_1PI by MPO has been reported, and it has also been observed that in the presence of an MPO inhibitor, lower concentrations of α_1PI are needed to inhibit digestion of basement membrane. Results indicate an excess of destructive activity in smokers' lungs. However, the question remains as to why all smokers do not develop pulmonary emphysema within a span of a few years.

86–0443. Gellert, A.R.; Lewis, C.A.; Langford, J.A., et al. **Regional Distribution of Pulmonary Epithelial Permeability in Normal Subjects and Patients With Asbestosis.** *Thorax* 40(10):734-740, October 1985.

In normal smokers, solute clearance was faster in the upper and middle zones, with a mean ratio of half time solute clearance from lungs to blood (T1/2LB) in the upper two-thirds to the lower one-third of the lungs of 0.66 (0.28 to 1.33), compared with 1.24 (0.43 to 2.77) in normal nonsmokers ($p<0.002$). Regional abnormalities in pulmonary epithelial permeability (using a computer-assisted technique for assessing spatial distribution of changes without intravenous injection of isotope to correct for blood tissue background activity) may offer insight into the pathogenesis of interstitial lung diseases and smoking-related disorders. The noninvasive technique was applied to 52 normal subjects (31 nonsmokers 21 smokers) and to 37 patients with asbestosis (21 nonsmokers and 16 smokers with mean asbestos exposure of 19 years). In patients with asbestosis, solute clearance was accelerated throughout the lungs even though radiographic abnormalities were limited to lower or lower and middle zones. Regional distribution of clearance was not affected by posture in normal subjects. Overall solute clearance was significantly faster in normal current smokers and in patients with asbestosis than in normal nonsmokers. Among patients with asbestosis, smokers had faster overall clearance than nonsmokers ($p<0.01$). Among normal nonsmokers, T1/2LB was not significantly different between never smokers and ex-smokers. (Auth. Abs. Mod.)

86–0444. Gullvag, B.; Mylius, E.; Nilsen, A. **Counting Alveolar Macrophages (AM) From Expectorate Samples of Exposed Workers as a Test for Lung Irritation From Occupational Exposure.** *Bulletin of Environmental Contamination and Toxicology* 34(5):702-708, May 1985.

The method described for counting alveolar macrophages in expectorated sputum was demonstrated in smokers and nonsmokers occupationally exposed to chemical pollution in a primary aluminum reduction plant. The 143 workers were randomly selected from three potrooms, a foundry, an anode paste plant, and a maintenance department. The 36 controls were selected from a neighboring town. Results indicated that cigarette smoking and occupational pollution act synergistically in increasing the levels of alveolar macrophages in the lungs. The highest numbers of macrophages were found in samples from both smokers and nonsmokers in potrooms 1 and 2. Significant results include (1) a big difference between exposed smokers and nonsmokers in all groups; and (2) median alveolar macrophage numbers for exposed smokers were higher than those for controls who smoked and exposed nonsmokers. Observed increases in smokers may be due to increased production of alveolar macrophages and/or decreased clearance from lung tissue. The latter mechanism is strongly supported, since cigarette smoking reduces ciliary movement in bronchial epithelium.

86–0445. Gutzwiller, F. **Epidemiology of Chronic Bronchitis.** *European Journal of Respiratory Diseases* 66(Supplement 139):19-20, 1985.

Smoking was identified as a dominant factor in etiology of chronic bronchitis in an epidemiological study conducted in Switzerland. Chronic respiratory disease appears to develop in response to cumulative insults from intense smoking, recurrent respiratory disease in childhood, occupational dusts, and atmospheric and other types of pollution. Incidence of chronic bronchitis is significantly higher in men and women who are cigarette smokers and who have low degrees of lung function initially (asthma or wheeze). The risk of developing obstructive airways disease in the next 15 years is about 1 in 200 for a 45-year-old male who does not smoke; the risk for a male of similar age who smokes 40 cigarettes/day is 1 in 5 or 6. Workers are prone to developing chronic bronchitis from occupational exposures, particularly if they are cigarette smokers. Incidence of bronchitis is more frequent among men and women who live in areas heavily polluted by coal smoke and sulfur oxides/particulates. Prevalence of chronic bronchitis also showed an increase with age, and was higher in men than in women at age 45. Although incidence declined in men aged 50 to 64 years, it remained the same for women between 35 and 64 years of age. (Auth. Abs. Mod.)

86–0446. Hogg, J.C.; Wright, J.L.; Pare, P.D. **Airways Disease: Evolution, Pathology, and Recognition.** *Medical Journal of Australia* 142(11):605-607, May 27, 1985.

Results show that a surprising amount of inflammatory disease and emphysema may be present in smokers' lungs in the absence of airflow obstruction. Forced expiratory volume in 1 sec (FEV_1) was <80 percent of predicted values in half of the 161 patients (9 nonsmokers) tested. Analysis showed that as FEV_1 changed from ≥ 100 to <50 percent of predicted, total lung capacity and functional residual capacity remained close to 100 percent of predicted. However, residual volume increased significantly when FEV_1 fell below 60 percent of predicted, and diffusing capacity decreased while FEV_1 was still above 80 percent of predicted values. Pathological changes did not increase significantly until FEV_1 fell to <50 percent of predicted. Patients showed a modest trend toward greater lung function deterioration as smoking levels increased. However, when the nine nonsmokers were excluded, the trend became nonsignificant. Correspondingly, a substantial number of those with severe centrilobular emphysema showed FEV_1 that was >80 percent of predicted.

86–0447. Jeffery, P.K.; Rogers, D.F.; Ayers, M.M. **Effect of Oral Acetylcysteine on Tobacco Smoke-Induced Secretory Cell Hyperplasia.** *European Journal of Respiratory Diseases* 66(Supplement 139):117-122, 1985.

High doses of oral N-acetylcysteine (NAC) inhibited increases in epithelial thickness, secretory cell number, and cell division in an animal model of smoke-induced bronchitis. Male albino rats were divided into four groups: (1) 24, no tobacco smoke (TS) and no drug; (2) 26, no TS but NAC (1,040 mg/kg body weight); (3) 32, TS but no drug; and (4) 29, TS plus NAC. NAC-treated animals showed no ill effects throughout the 26-day investigation. NAC did not protect against the decline in weight gain in TS-exposed animals. TS caused significant increase ($p<0.01$) in secretory cell number (62 to 421 percent of control values) at all airway levels except upper trachea. NAC inhibited the increase (35 to 118 percent) at all airway levels ($p<0.01$ to 0.05), mostly in secretory cells containing acidic glycoprotein. TS exposure also induced a significant rise in concentration of epithelial cells and in number of ciliated, mucous, and especially basal cells ($p<0.001$). NAC inhibited mucous cell increase ($p<0.001$) and affected cell division by (1) delaying the peak for 3 days, (2) greatly reducing size, and (3) prolonging at lower level until return to control values at 10 days of TS exposure. (Auth. Abs. Mod.)

86–0448. Lancet. **Treatment for α_1-Antitrypsin Deficiency.** *Lancet* 2(8459):812-813, October 12, 1985.

It is suggested that the best treatment for genetic deficiency of α_1-antitrypsin (α_1AT) is to avoid cigarettes. About 1 in 1,000 northern Europeans has severe (PiZZ or PiSZ) α_1AT deficiency, and 1 in 25 carries the Z deficiency gene. The major clinical consequence is pulmonary emphysema. A 10-year study of 69 cases showed a mean decline in forced expiratory volume in 1 sec of >300 mL/year in smokers compared with 80 mL/year in nonsmokers. Also in the smokers, mean age of onset of dyspnea was 32, compared with 57 years in nonsmokers, and smoking patients' lifespan is shortened by an average of 20 years. Prevention or cessation of smoking, and possibly augmentation of antielastase activity, slows the progression to respiratory failure. However, advice against smoking among parents of newborns with severe α_1AT deficiency had little effect. It is suggested that smoking intervention be targeted at patients aged 10 to 12 years, when the impact of diagnosis could have maximal beneficial effects. Development of genetically engineered antielastases is also discussed.

86–0449. Leech, J.A.; Martz, L.; Liben, A., et al. **Diffusing Capacity for Carbon Monoxide. The Effects of Different Derivations of Breathhold Time and Alveolar Volume and of Carbon Monoxide Back Pressure on Calculated Results.** *American Review of Respiratory Disease* 132(5):1127-1129, November 1985.

The effect of deriving breathhold time and alveolar volume in different ways and of subtracting the back pressure of carbon monoxide on the calculated diffusing capacity (D_{LCO}) was examined in 398 young adult smokers, ex-smokers, and nonsmokers. Significantly higher values were obtained when recommendations of the ATS-DLD Epidemiology Standardization Project were followed for calculating breathhold time and alveolar volume rather than those of the ECCS Standardized Lung Function Testing Project. Significantly higher values for D_{LCO} were also obtained when CO back pressure was taken into account. In clinical laboratories, however, when correction for CO back pressure is omitted, it is unlikely to result in an underestimate of D_{LCO} of more than 5 percent, even in smokers. It is recommended that in reporting results of D_{LCO}, an explicit statement on method of measuring breathhold time and of calculating alveolar volume be included, and that CO back pressure be considered in measuring of D_{LCO} in all large population studies, particularly if D_{LCO} is used to screen small changes in occupational or smoking exposure studies. (Auth. Abs. Mod.)

86–0450. Lellouch, J.; Claude, J.-R.; Martin, J.-P., et al. **Smoking Does Not Reduce the Functional Activity of Serum Alpha-1-Proteinase Inhibitor. An Epidemiologic Study of 719 Healthy Men.** *American Review of Respiratory Disease* 132(4):818-820, October 1985.

Blood samples from 719 healthy men showed that smoking does not impair the functional activity of α_1-proteinase inhibitor (α_1PI). Serum concentrations of immunoreactive (I) and functionally active (F) α_1PI were measured by radial immunodiffusion and inhibition of porcine pancreatic elastase, respectively. Serum α_1PI concentrations were higher in men with MM phenotype than in those with other phenotypes. F-α_1PI levels were about 30 percent lower than I-α_1PI levels, but the ratios between the two concentrations did not vary significantly by phenotype except in MZ subjects. Concentrations of both F-α_1PI and I-α_1PI also increased with smoking, but ratios did not vary between smokers and nonsmokers (analyzed in MM and MS subjects only). Regression analysis showed that for given I-α_1PI, F-α_1PI is positively correlated to smoking.

86–0451. Lindell, S.E.; Ekberg, P.; Forsgren, A., et al. **Differences in Airway Obstruction Between Heavy Smokers.** *Clinical Physiology* 5(Supplement 3):81-83, 1985.

Differences in smoking habits may have an effect on development of airway obstruction, according to a study of 857 male heavy smokers living in Sweden. Airway obstruction occurred more often in men who started smoking before the age of 17 and smoked >25 g tobacco/day. Serum thiocyanate level was also higher in those with obstruction, and respiratory symptoms were two to three times more common. A family history of asthma was twice as common in obstructed men, who were also taller and heavier. Forced expiratory volume in 1 sec (FEV$_1$) averaged 47 cL/m^3 and FEV$_1$/vital capacity 60 percent in the obstructed group. Corresponding values for the nonobstructed group were cL/m^3 and 80 percent, respectively. There were no significant differences between the two groups regarding education, housing, civil status, type of job, and exposure to gases and dust.

86–0452. Miller, M.R.; Pincock, A.C.; Grove, D.M. **Patterns of Spirogram Abnormality in Individual Smokers.** *American Review of Respiratory Disease* 132(5):1034-1040, November 1985.

Time domain spirogram indices are helpful in defining patterns of spirogram abnormality, and contrary to expectation, the most prevalent in young and middle-aged smokers were those confined to early maximal forced expiratory maneuver. Dynamic ventilatory function measured in 147 male and 212 female smokers (mean age of 39.3 and 42.5 years, respectively) were compared with predicted values obtained from nonsmokers. Deviation from predicted was expressed as a standardized residual (SR). Although flow indices showed a substantial group change in SR for smokers, the distribution of SR indicated changes in the majority of smokers but did not favor identification of individual subjects as being abnormal. By contrast, distribution of SR for forced expiratory volume in 1 sec (FEV$_1$)/forced vital capacity (FVC) percent, FEV$_3$/FVC percent, and the time domain indices favored identification of two patterns of spirometric abnormality prevalent among smokers. Pattern 1 changes were predominantly in the first 75 percent of FVC and pattern 2 changes were generally confined to the tail of the spirogram; 15 percent of the female and 14 percent of the male smokers had pattern 1 abnormalities; only 4 percent of both female and male smokers showed pattern 2. (Auth. Abs. Mod.)

86–0453. Morgan, W.K.C. **Prevalence of Radiographic Appearance of Pneumoconiosis in an Unexposed Blue Collar Population. (Letter).** *American Review of Respiratory Disease* 132(5):1139, November 1985.

The conclusion of an earlier article (*American Review of Respiratory Disease* 131(5):684-686, 1985) is not considered justified, since numerous studies have shown that smoking, age, and dust exposure contribute to prevalence of small irregular opacities in chest radiographs. If dust exposure is excluded by selecting non-dust-exposed workers, and the population chosen has a mean age of 33 years, thereby excluding or strictly limiting the effects of the two factors, it becomes hardly surprising that an effect from either smoking or age is difficult to demonstrate. All persons with irregular opacities were over the mean age of the study group, and five of the eight were in their sixth decade or older. In a different context, equating the presence of irregular opacities with fibrosis seems inappropriate. Scanty irregular opacities are common to both early asbestosis and to airways obstruction resulting from cigarette smoke. Irregular opacities in an asbestos-exposed population usually denotes presence of interstitial fibrosis and lungs that are stiffer than normal. In cigarette smokers their presence is associated with excessively compliant lungs. Pathophysiology of the two conditions is antithetical. Using the term pulmonary fibrosis for the two conditions (when pathology of the two processes differs so markedly) serves to confuse rather than clarify. (Auth. Abs. Mod.) See also 85-1708.

86–0454. Nath, A.R.; Hegde, A.V.; Mehta, P.J. **Bronchoalveolar Lavage.** *Journal of Association of Physicians of India* 33(4):287-291, April 1985.

The uses of bronchoalveolar lavage (BAL) for diagnosis, therapy, and monitoring prognosis and in research are reviewed, as are the characteristics of BAL fluid in healthy nonsmokers and smokers and lung disease patients. The most consistent finding in healthy smokers is the retrieval of many more cells from the airways. There is usually a marked increase in alveolar macrophages, polymorphonuclear leukocytes, and lymphocytes, although the mitogenic responses of the lymphocytes are often impaired. In acellular fluid, increases are observed in immunoglobulin G, fibronectin, and the carcinoembryonic antigen/total protein ratio. Decreases in antitrypsin activity are often found, but BAL at present has no prognostic significance in smokers. Procedures for using the fiberoptic bronchoscope, including selection of patients and bronchoscopes, premedicating the patient, site of lavage, lavage techniques, and monitoring the patient during the procedure, are detailed. In addition, processing of the BAL fluid and complications associated with the procedure are described.

86–0455. Ohta, Y.; Shiraishi, H.; Tabata, Y. **An Electron Spin Resonance Study of Free Radicals in Black Dust Deposited in Human Lungs.** *Archives of Environmental Health* 40(5):279-282, September-October 1985.

Free radicals were detected in all electron spin resonance (ESR) measurements of black dust deposited in autopsied lungs in an investigation of the correlation of black coloration with smoking. ESR spectra indicated the presence of two types of radicals of apparently singlet lines in lung specimens from eight persons (four smokers, average 10 to 30 cigarettes/day) aged 19 to 78 years. Left upper lobes obtained at autopsy revealed positive pathohistological findings although there was no reported history of lung disease. The component with the narrower modulation width, 2.7 G, and the smaller g factor, 2.0025, was attributed to carbon radicals associated with combustion of hydrocarbons. Tobacco smoke, reportedly containing the same type of free radicals, was considered one of the probable sources. This component (R_1) was greatest in specimens of heavy cigarette smokers and was related to smoking. The R_1 component in lesser amounts was also present in nonsmokers, possibly as a result of other factors such as inhalation of combustion fumes or soot from other sources. The other component, with a width of about 10 G and g factor of 2.0037, was found to be more common among specimens. Assignment of the latter component is not very clear, but an oxygen-related radical is a possible candidate. (Auth. Abs. Mod.)

86–0456. Olivieri, D.; Marsico, S.A.; Del Donno, M. **Improvement of Mucociliary Transport in Smokers by Mucolytics.** *European Journal of Respiratory Diseases* 66(Supplement 139):142-145, 1985.

The mucolytic drugs N-acetylcysteine (NAC, 600 mg/day) and ambroxol (AMB, 90 mg/day) produced significant increases in mucociliary transport (MCT) in heavy smokers with hypersecretory bronchitis and homogeneous reduction of MCT. Drugs were administered to 10 men and 2 women (aged 25 to 64) suffering from simple catarrhal bronchitis with MCT reduction between 30 and 60 percent of that in healthy nonsmokers. In addition, selected subjects responded to preliminary administration of 400 μg of fenoterol by metered aerosol spray, increasing MCT rate at least 50 percent of baseline. Placebos were administered for 10 days between administration of NAC and AMB. Data analysis indicated that (1) NAC and AMB administered both before and after placebo produced a significant increase in MCT; (2) NAC showed slightly greater efficacy than AMB, but differences were not statistically significant; (3) overall efficacy of NAC and AMB was consistently greater than that of placebo; and (4) sequence of administration did not influence drug effect. (Auth. Abs. Mod.)

86–0457. Petersen, M.; Hankinson, J. **Spirometry Reference Values for Nonexposed Blue-Collar Workers.** *Journal of Occupational Medicine* 27(9):644-650, September 1985.

Lung function prediction equations are provided for normal smoking and nonsmoking blue-collar workers that can be compared with data on subjects exposed to health hazards in the workplace. Smoking and nonsmoking workers with no obvious adverse occupational exposures were selected and tested for various lung function parameters. Subjects completed a standard questionnaire and had standard chest roentgenograms taken. Prediction equations were established for six spirometric indices, and a method was devised for using the equations to compare a study group with this external nonexposed group. Asymptomatic nonsmokers with negative roentgenograms were extracted from the overall group, and comparison with published data for other such normal groups showed that the present group is similar to most, indicating that there are no serious biases in the present group. (Auth. Abs. Mod.)

86–0458. Petitti, D.B.; Friedman, G.D. **Respiratory Morbidity in Smokers of Low- and High-Yield Cigarettes.** *Preventive Medicine* 14(2):217-225, March 1985.

Medical records of 4,610 regular smokers and 2,035 never smokers showed that, with regard to pneumonia and influenza in an outpatient setting, smoking low-yield cigarettes is probably less hazardous than smoking high-yield cigarettes, but is still a hazard compared with not smoking. Records were reviewed to determine the association between smoking low-yield cigarettes (tar <15.0 mg, nicotine <1.0 mg/cigarette) and respiratory disease. In the year following recruitment, incidence of pneumonia or influenza was lower among women (but not men) who smoked low-yield cigarettes ($p<0.01$) than among smokers of high-yield cigarettes. The percentage of persons with any respiratory tract disease was lower in both male and female low-yield cigarette smokers ($p<0.01$). Multiple logistic regression analysis (controlled for age, sex, race, and number of cigarettes smoked/day) that included tar level as a continuous variable revealed that smoking low-yield cigarettes was associated with lower risk for pneumonia or influenza, but not for risk of other specific respiratory infections or conditions, or respiratory diseases considered as a group. Smokers of low-yield cigarettes also had a higher risk for pneumonia or influenza and chronic obstructive pulmonary disease than never smokers. (Auth. Abs. Mod.)

86–0459. Petty, T.L. **Pulmonary Medicine.** *Journal of the American Medical Association* 254(16):2271-2273, October 1985.

Smoking is the greatest preventable risk factor of lung cancer, the commonest cancer in both men and women and still the most rapidly increasing malignancy. Society needs to be convinced that smoking, whether active or passive, is potentially lethal and that habit patterns and attitudes that encourage and tolerate smoking need to be changed. Annual chest roentgenograms and sputum cytology are effective in identifying squamous cell carcinoma in time to improve survival through early resection. A 20-year prospective study has clearly shown that stopping smoking at any time in the development of chronic airflow obstruction has a favorable effect on the course and prognosis of chronic obstructive pulmonary disease (COPD). New agents such as bitolterol mesylate, a potent and long-acting inhaled β-agonist, are available to improve airflow in acute and chronic airflow obstruction and are contributing to more effective bronchodilator therapy for patients with asthma and COPD with reversible bronchospasm. The Framingham study proved the value of forced vital capacity as a survival predictor. The spirometer is the key instrument to identify patients with both obstructive and restrictive lung disease and is critical in guiding therapy with bronchodilators and corticosteroids. Real progress in pulmonary medicine must focus on an attitude change in favor of prevention rather than on the alternative of spending major resources on end-stage lung diseases.

86–0460. Plamenac, P.; Santic, Z.; Nikulin, A., et al. **Cytologic Changes of the Respiratory Tract in Vineyard Spraying Workers.** *European Journal of Respiratory Diseases* 67(1):50-55, July 1985.

Sputum specimens, obtained from 52 rural vineyard workers engaged in copper sulfate spraying (14 smokers) and 51 rural workers not engaged in spraying (21 smokers), were stained with hematoxylin and eosin for cytological analysis and tested for the presence of copper with rubeanic acid. Abnormal columnar cells were observed in sputa from 100 percent of smoking and 82 percent of nonsmoking vineyard workers; squamous metaplasia without atypia was found in 58 and 36 percent, respectively. Cellular atypia was observed in 29 percent of smokers and 5 percent of nonsmokers. Samples from 64 percent of smokers and 42 percent of nonsmokers contained yellowish-brown granular material in macrophage cytoplasm that tested positive for copper. Among controls, overall expectoration was lower in both smokers and nonsmokers than in vineyard workers. Twenty of the control smokers (95 percent) produced sputa with abnormal columnar cells compared with only three (10 percent) of the control nonsmokers. Control smokers also had a higher prevalence of squamous metaplasia with atypia (5 percent) or without atypia (14 percent), eosinophilia (19 percent), and respiratory spirals (43 percent) than nonsmokers (0, 0, 3, and 7 percent, respectively).

86–0461. Polla, B.; De Rochemonteix, B.; Junod, A.F., et al. **Effects of LTB$_4$ and Ca++ Ionophore A23187 on the Release by Human Alveolar Macrophages of Factors Controlling Fibroblast Functions.** *Biochemical and Biophysical Research Communications* 129(2):560-567, June 14, 1985.

Cultured human alveolar macrophages (AM) obtained from heavy smokers with lung cancer spontaneously produced variable amounts of factors stimulating fibroblast proliferation and production of prostaglandin E$_2$ (PGE$_2$) and collagenase by fibroblasts. When added to AM, both leukotriene B$_4$ (LTB$_4$) and Ca++ ionophore (ionophore) were observed to increase the release of fibroblast proliferation activity. Effects were observed at concentrations as low as 0.3 μmol of LTB$_4$ and 0.2 μmol of ionophore. Addition of LTB$_4$ and ionophore to AM also resulted in an increase in PGE$_2$- and collagenase-stimulating activity and was observed at similar concentrations. Biological activities observed after AM stimulation were compatible with the presence of monokine with an apparent molecular weight of approximately 15 to 20 Kd. It is concluded that, in addition to its role in the recruitment and activation of polymorphonuclear leukocytes in the lung, LTB$_4$ produced by human AM may amplify monokine production by AM and contribute to development of inflammation.

86–0462. Postma, D.S.; Steenhuis, E.J.; van der Weele, L.T., et al. **Severe Chronic Airflow Obstruction: Can Corticosteroids Slow Down Progression?** *European Journal of Respiratory Diseases* 67(1):56-64, July 1985.

Smoking habits influenced survival in a long-term (14 to 18 years) retrospective study of patients with severe chronic airflow obstruction (CAO). Of the 79 patients with CAO, 65 had at least seven serial forced expiratory volume in 1 sec (FEV$_1$) values available. Over the study period, three distinct FEV$_1$ patterns were noted and used to differentiate patients: no change (NCH), initial increase followed by decrease (CON), and linear decrease (LIN). The proportion of smokers was 75 percent in the LIN group, 91 percent in the NCH group, and 50 percent in the CON group. Although smoking had a significant influence on survival in the LIN and CON groups ($p<0.01$), survival among smokers in the LIN group was worse than in the CON group ($p<0.001$). For those taking prednisolone, dose reduction to 7.5 mg or less in the CON group contributed to a steeper decline in FEV$_1$/year among smokers than among nonsmokers (54.5 and 38.8 mL/year, respectively, $p<0.01$). Overall, the three FEV$_1$ patterns showed strong association with long-term use of prednisolone. It is concluded that oral prednisolone doses above 7.5 mg/day may slow down disease progression in CAO patients. (Auth. Abs. Mod.)

86–0463. Roels, H.; Sarhan, M.J.; Hanotiau, I., et al. **Preclinical Toxic Effects of Manganese in Workers From A Mn Salts and Oxides Producing Plant.** *Science of the Total Environment* 42:201-206, 1985.

Smoking and manganese (Mn) exposure was found to have additive and not synergistic effects in an epidemiological study of 141 workers in a Mn salts and oxides producing plant in Belgium. Higher prevalence of cough, sputum, dyspnea, and acute bronchitis were found in Mn-exposed workers. Ventilatory parameters were compared among four subgroups: 29 control nonsmokers, 75 control smokers, 29 Mn-exposed nonsmokers, and 112 Mn-exposed smokers. Lung function parameters were standardized for age and height. Lung function alterations were mild, showing a slight decrease in midexpiratory flow rate (MEFR) at 50 and 75 percent of forced vital capacity (FVC) in Mn-exposed nonsmokers, and a statistically significant difference in FVC, forced expiratory volume in 1 sec (FEV_1), and peak expiratory flow rate (PEFR) between control smokers and Mn-exposed smokers. Analysis of variance of the four subgroups revealed a slight effect of smoking on MEFR at 75 percent of FVC and a significant ($p<0.05$) effect of Mn exposure on FVC, FEV_1, and PEFR, but there were no interactive effects from smoking and Mn exposure. (Auth. Abs. Mod.)

86–0464. Saetta, M.; Ghezzo, H.; Kim, W.D., et al. **Loss of Alveolar Attachments in Smokers. A Morphometric Correlate of Lung Function Impairment.** *American Review of Respiratory Disease* 132(4):894-900, October 1985.

The relationship between the number of alveolar attachments, airways inflammation, and lung function was examined postmortem in the lungs of 9 nonsmokers and 9 smokers and in 14 smokers undergoing thoracotomy for localized pulmonary lesions. Alveolar attachments are the alveolar walls radially attached to the small airways; any discontinuity or rupture was considered abnormal. Normal and abnormal attachments were counted and expressed as number of attachments, distance between attachments, and percentage of abnormal attachments. Although internal small airways diameter and mean linear intercept were not significantly different between smokers of either group and nonsmokers, significant differences in number of attachments ($p<0.001$), distance between attachments ($p<0.01$), and percentage of abnormal attachments ($p<0.01$) were found. The three indexes correlated significantly with the score for airways inflammation and with the elastic recoil pressure in smokers. No significant correlation with any other lung function test was found. It is concluded that smokers have fewer alveolar attachments than nonsmokers and that the loss of alveolar attachments represents an early stage in the destruction of lung parenchyma, which is probably linked to inflammation of the small airways. Because of the strategic situation of this lesion, it could be responsible in part for the loss of elastic recoil seen in the initial stages of chronic obstructive pulmonary disease. (Auth. Abs. Mod.)

86–0465. Spinaci, S.; Bugiani, M., Arossa, W., et al. **A Multivariate Analysis of the Risk in Chronic Obstructive Lung Disease (COLD).** *Journal of Chronic Diseases* 38(5):449-453, 1985.

Cluster analysis was able to identify patients with poorer general condition and higher prevalence of risk factors (including smoking) and, consequently, worse prognosis from among 398 men and 134 women with advanced chronic obstructive lung disease (COLD). To assess the validity of cluster analysis for patient screening, physiological measurements and questionnaire data from patients (274 smokers, 144 ex-smokers, 114 nonsmokers) were obtained. In the two subgroups identified, Cluster I patients had significantly greater physiological impairment than patients in Cluster II. Comparison of variable prevalence outside the model showed that Cluster I included a significantly higher number of heavy smokers ($p<0.01$) with prolonged occupational exposure ($p<0.05$), lower body weight ($p<0.05$), respiratory problems requiring hospitalization ($p<0.02$), and emphysema ($p<0.01$). Advantages of cluster analysis compared with other techniques of classifying patients are discussed. (Auth. Abs. Mod.)

86–0466. Starzynski, Z.; Kubasiewicz, M.; Wilczynska, U., et al. **Przewlekly Niezyt Oskrzeli w Populacji Pracownikow Przemyslu Wlokienniczego w Lodzi. [Chronic Bronchitis in Textile Industry Workers in Lodz].** *Medycyna Pracy* 35(6):409-415, November-December 1984, Polish.

Chronic bronchitis among Lodz (Poland) textile industry workers and its relationship to smoking habits, working conditions, age, and sex were evaluated in a cross-sectional representative health study. Chronic bronchitis, confirmed in 142 men and 134 women (4.2 percent of workers), was found predominantly among smokers and linked with cigarette smoking. Symptoms were also found more often in ex-smokers than in nonsmokers. Age was a factor only in relation to duration of smoking habit. In smokers, the number of cases increased in both men and women with duration of smoking and daily consumption of cigarettes. No significant sex-related differences were noted. Among 214 smokers working in a dusty environment (>4 mg/m^3 of cotton, wool, and artificial fibers), there were 12 cases (5.6 percent) of chronic bronchitis diagnosed compared with 10 cases among 237 nonsmokers (4.2 percent). There were 79 cases (5.0 percent) among 1,579 smokers not exposed to industrial dust, compared with 28 cases among 1,396 nonsmokers (2.0 percent).

86–0467. Steen, V.D.; Owens, G.R.; Fino, G.J., et al. **Pulmonary Involvement in Systemic Sclerosis (Scleroderma).** *Arthritis and Rheumatism* 28(7):759-767, July 1985.

Effects of smoking were investigated in systemic sclerosis patients with diffuse scleroderma and CREST (calcinosis, Raynaud's phenomenon, esophageal dysmotility, sclerodactyly, and telangiectasias) syndrome variants. Pulmonary function abnormalities were compared in 165 nonsmokers and 137 smokers. There was a significantly higher number of male smokers (38 vs. 9 percent; $p<0.001$), but age and disease duration were similar in the two groups. Smokers with restrictive lung disease had more severe disease than nonsmokers. Obstructive changes were more than twice as common in smokers (28 vs. 12 percent; $p<0.05$), and there were fewer smokers with normal pulmonary function test results (18 vs. 33 percent). Smokers had a significantly decreased forced expiratory volume in 1 sec to forced vital capacity (FVC) ratio. Although FVC was similar in both groups, smokers with restrictive changes had significantly decreased FVC compared with nonsmokers ($p<0.05$). Diffusing capacity or carbon monoxide was also significantly decreased in smokers who had any of the physiologic abnormalities. (Auth. Abs. Mod.)

86–0468. Stjernberg, N.; Eklund, A.; Nystrom, L., et al. **Prevalence of Bronchial Asthma and Chronic Bronchitis in a**

Community in Northern Sweden; Relation to Environmental and Occupational Exposure to Sulphur Dioxide. *European Journal of Respiratory Diseases* 67(1):41-49, July 1985.

A statistically significant relationship between the presence of chronic bronchitis and sex, age, smoking ($p<0.001$), and employment at a sulfite pulp factory was observed in a study of the prevalence of chronic bronchitis and bronchial asthma in a community in northern Sweden. A questionnaire concerning respiratory symptoms, distributed to the 2,374 individuals aged 16 to 72 years, was completed by 2,203 (93 percent). Overall, 613 (27.8 percent) were smokers, 398 (18.1 percent) were ex-smokers, and 1,191 (54.1 percent) were nonsmokers. Among women, 25 percent were smokers, 12 percent were ex-smokers, and 63 percent were nonsmokers compared with 30, 24, and 46 percent, respectively, among men. Bronchial asthma was found in 78 individuals (3.5 percent), chronic bronchitis in 57 (2.8 percent), and both diagnoses in 3 individuals (0.1 percent). Of 18 individuals with obstructive chronic bronchitis, 13 were smokers or ex-smokers. Sulfur dioxide exposure at the factory apparently acted synergistically with smoking, increasing the relative risk for chronic bronchitis from 1.0 in nonsmokers to 15.3 in smokers. The relative risk for chronic bronchitis in nonemployee smokers was 5.1.

86–0469. Sue, D.Y.; Oren, A.; Hansen, J.E., et al. **Lung Function and Exercise Performance in Smoking and Nonsmoking Asbestos-Exposed Workers.** *American Review of Respiratory Disease* 132(3):612-618, September 1985.

The effect of smoking on lung function in asbestos-exposed shipyard workers was assessed in 73 smokers and 73 nonsmokers matched for age, duration of asbestos exposure, and quantity of asbestos dust in the work environment. Pulmonary function and performance during cycle incremental exercise were compared between smokers and nonsmokers. Nonsmokers had significantly higher mean vital capacity (VC), forced expiratory volume in 1 sec (FEV_1), FEV_1/VC, and diffusing capacity for carbon monoxide than smokers. Only 3 nonsmokers, compared with 23 smokers, had FEV_1/VC below the 95 percent confidence limit of predicted value. Forced expiratory flow between 25 and 75 percent of VC failed to identify additional subjects with obstruction not found by FEV_1/VC. During exercise, despite no difference in maximal heart rate, maximal O_2 uptake (VO_2 max) and oxygen-pulse were lower among smokers. In addition, smokers more frequently had abnormal alveolar-arterial oxygen tension at maximal exercise. Of 33 smokers who had VO_2 max <80 percent of predicted, 16 were judged to have cardiac disease, whereas only 2 appeared to be limited by obstruction. Only 15 nonsmokers had VO_2 max <80 percent. It is concluded that cigarette smoking was the major contributing factor to the obstructive lung disease observed in asbestos workers, and had a strong influence on the occurrence, nature, and magnitude of exercise limitation. (Auth. Abs. Mod.)

86–0470. Vastag, E.; Matthys, H.; Kohler, D., et al. **Mucociliary Clearance and Airways Obstruction in Smokers, Ex-Smokers and Normal Subjects Who Never Smoked.** *European Journal of Respiratory Diseases* 66(Supplement 139):93-100, 1985.

Smoking leads to chronic bronchitis and, depending on consumption level, to reduction in mucociliary clearance and increase in bronchial obstruction. Correlation between smoking habits (pack-years, smoking and ex-smoking time), mucociliary clearance rate (MC), and airways obstruction was analyzed in 17 ex-smokers (10 with chronic bronchitis) and 48 smokers (35 with chronic bronchitis). MC was measured with 99mTc-tagged monodisperse erythrocytes. Static and dynamic lung volumes, maximal expiratory flow volume curve, and airway resistance were measured by whole body plethysmography. Ex-smokers without chronic bronchitis showed the same MC as the 80 controls who had never smoked. Controls also had less airway obstruction. Smokers without chronic bronchitis had normal ventilatory function tests but lower MC rate than healthy ex-smokers and control subjects who never smoked ($p<0.01$). Ex-smokers and smokers with chronic bronchitis had lower MC rate and more airway obstruction ($p<0.001$) than subjects without chronic bronchitis. Ex-smokers with persistent symptoms of chronic bronchitis had the severest airways obstruction. Smokers with chronic bronchitis showed the most delayed central MC rate but less airway obstruction than ex-smokers with persistent symptoms of chronic bronchitis. Smoking habits (pack-years) correlated with decreased MC rate ($p<0.01$) and degree of airways obstruction ($p<0.001$). (Auth. Abs. Mod.)

See also **86–0418, 86–0578**

CARDIOVASCULAR DISEASES

86–0471. Ahmed, S.S.; Torres, R.; Regan, T.J. **Interaction of Chronic Cigarette and Ethanol Use on Myocardium.** *Clinical Cardiology* 8(3):129-136, March 1985.

Cigarette smoking combined with ethanol over a relatively long period produced no greater myocardial abnormalities than ethanol alone, and may not have an essential role in genesis of cardiomyopathy in alcoholics. To determine if cigarette use intensifies abnormalities of myocardial function and composition in experimental alcoholism, four groups of young adult male beagle dogs with tracheostomy were tested: (1) 10 controls; (2) 9 smoking seven cigarettes/day; (3) 7 fed ethanol as 20 percent of calories; and (4) 6 receiving both ethanol and cigarettes. After 18 months, left ventricular function was assessed under anesthesia. Heart rate, left ventricular end diastolic pressures, and volumes (indicator dilution) did not differ. An index of contractility derived by normalizing peak maximal rate of rise of left ventricular pressure (dP/dt) for pre- and afterload was reduced significantly below the level of 2.41 ± 0.7 cm/s in controls: 1.41 ± 0.35 in group 2, 1.19 ± 0.38 in group 3, and 1.28 ± 0.17 in the ethanol/cigarette group (each $p<0.002$). Arterial pressures were moderately elevated above group 1 in all three experimental groups without evidence of left ventricular hypertrophy. In contrast to smoking, which elicited no abnormalities of myocardial cation composition, ethanol reduced myocardial potassium and sodium in group 3 without a gain of water content. (Auth. Abs. Mod.)

86–0472. Antongiovanni, G.B.; Giudici, V.; Musicco, M., et al. **Distribution of Risk Factors in Relation to the Presence of Cerebral Angiographic Lesions in TIA and Minor Stroke Patients.** *Italian Journal of Neurological Sciences* 6(1):79-84, March 1985.

Smoking, hypertension, obesity, and elevated serum cholesterol level were significantly more prevalent in 36 patients (72.2 percent smokers) who had suffered transient ischemic cerebral attacks (TIA) and 20 patients (85 percent smokers) who had suffered a minor stroke than in the general population. However, none of the clinical or other parameters differed between TIA and minor stroke patients. Subsequently, 50 subjects underwent coronary angiography and 25 were found to have angiographic lesions of the cerebral circulation (A+ group). Compared with patients without angiographic lesions (A- group), A+ patients had a significantly higher mean cigarette smoke exposure index (number consumed/day x years of smoking habit duration). The A+ group also had higher serum cholesterol levels, but no differences were found for hypertension, diabetes, or family history of cerebral or cardiac ischemic disease. Resting ECG alterations and positive exercise test results were more frequent in the A+ group, but no differences were observed in computerized tomography results.

86–0473. Baker, L.L.; Criqui, M.H. **High- and Low-Density Lipoprotein Cholesterol: Correlates in an Older Population.** *Preventive Medicine* 14(2):155-164, March 1985.

The associations of high- and low-density lipoprotein cholesterol (HDL and LDL) with smoking, age, alcohol use, obesity, diet, exercise, and use of medications were examined in a predominantly upper-middle-class white population of 279 men and 345 women (average age 66 years). Average daily cigarette consumption was 3.4 ± 9.4 for men and 2.9 ± 7.9 for women. Multiple linear regression analysis showed women who smoked had significantly lower blood HDL levels than nonsmokers ($p<0.05$). Men who smoked also tended to have lower (statistically insignificant) HDL levels ($p=0.17$). LDL levels were consistently increased in both male and female smokers, but neither group achieved statistical significance (men, $p=0.28$; women, $p=0.14$). Other factors found to be positively associated with HDL levels were alcohol use, average and above average exercise, postmenopausal estrogen use in women, vitamin B intake, and corticosteroid use. Obesity in men and thyroid hormone use were inversely related to HDL levels. The only significant correlates of LDL levels were an increase with age in women and lower levels in women using thyroid hormone.

86–0474. Boletin - Asociacion Medica de Puerto Rico. **Joint Recommendations on Secondary Prevention for Persons With Clinical Coronary Heart Disease.** *Boletin - Asociacion Medica de Puerto Rico* 77(4):151-156, April 1985.

Updated recommendations for secondary prevention of coronary heart disease in the areas of smoking, hypertension, diet, diabetes, physical activity, stress, and other risk factors (developed by a joint council of the International Society and Federation of Cardiology) are described. Smoking is associated with increased risk of recurrent coronary episodes in patients with coronary heart disease (CHD), including those who recovered from acute myocardial infarction (MI). It is essential that physicians advise these patients to discontinue all forms of smoking. Important points relating to advice on smoking cessation include (1) a committed and informed approach by the medical team should include enforcement of no-smoking policies and repeated cessation advice for patients; (2) cessation advice by physicians is an effective means for achieving success; (3) no evidence exists to support the idea that sudden cessation of smoking can have harmful effects; (4) advice should be provided to the patient as early as possible; (5) family support is important; (6) printed material and audiovisual aids should be used to help emphasize, but not replace, personal advice; and (7) long-term repetition of advice and continued support are necessary to achieve the highest possible cessation rate and to help the patient not resume smoking.

86–0475. Burch, P.R.J. **Myocardial Infarction in Women Younger Than 50 Years. (Letter).** *Journal of the American Medical Association* 254(20):2893, November 1985.

Parallels between fatal acute myocardial infarction (MI) and nonfatal MI suggest that constitutional factors may well be largely or wholly responsible for the high relative risk in young heavy smokers. Theory holds that acute MI, the major component of fatal ischemic heart disease occurring in people younger than 70 years, is initiated in genetically predisposed people by six somatic gene mutations. This stochastic initiation process is followed by a latent period (average about 12 years in U.S. white males; 24 years in females) before death occurs, through the triggering of a lethal forbidden clone by an extrinsic agent that depends both on season and longer term trends. The mean latent period is shorter in smokers than in nonsmokers and in heavy smokers than in light smokers. This latent period differential accounts for the age dependence of mortality ratios. Analysis of temporal trends in sex- and age-specific mortality from ischemic heart disease in the United States over the 1968 to 1975 period indicates, however, that smoking does not cause the shortening of the latent period. Rather, people predisposed to smoking tend also to be predisposed to a short latent period. Further study is needed to resolve this issue. (Auth. Abs. Mod.)

86–0476. Carel, R.S.; Eviatar, J. **Factors Affecting Leukocyte Count in Healthy Adults.** *Preventive Medicine* 14(5):607-619, September 1985.

Normal white blood cell (WBC) count and leukocyte levels were increased with increased smoking intensity in smokers in a study of 35,000 apparently healthy men and women. Of all health factors analyzed, cigarette smoking had the strongest effect on WBC count, indicating a direct relationship. Among nonsmokers of all ethnic, sex, and age groups, mean WBC was nearly identical. Male smokers had higher counts than female smokers in most age and ethnic groups. Male and female smokers showed a slight increase in mean WBC count until the sixth decade. In all age and ethnic groups, smokers of both sexes had higher mean WBC count (about 1,000 cells/mm^3) than nonsmokers. Differences between smokers and nonsmokers were much larger than those found between sexes, age groups, or ethnic groups. The effect of smoking on WBC count was only partially explained by an inflammatory process, e.g., chronic bronchitis. Statistically significant relationships were found between WBC count and the following variables: hemoglobin, heart rate, weight (or Quetelet index), cholesterol, uric acid, creatinine, sex, ethnic origin, systolic blood pressure, height, blood sugar, and diastolic blood pressure. This may have both a diagnostic and prognostic significance in different clinical settings. (Auth. Abs. Mod.)

86–0477. Comstock, G.W.; Suzuki, T.; Stone, R.W., et al. **Cardiovascular Risk Factors in American and Japanese Executives.** *Journal of the Royal Society of Medicine* 78(7):536-545, July 1985.

Japanese executives were much more likely to be cigarette smokers and showed a greater increase in blood pressure with age, while American executives were more obese, obtained a higher proportion of their caloric intake from animal fats, had higher serum cholesterol levels, and higher prevalence of self-reported stress. Of 832 American Telephone and Telegraph Company and 705 Nippon Telegraph and Telephone Public Corporation employees who completed a smoking history questionnaire, 147 (17.7 percent) and 355 (50.4 percent), respectively, were currently smoking cigarettes and 275 (33.1 percent) and 155 (22.0 percent), respectively, were ex-smokers. The median number of cigarettes smoked/day was nearly the same: 27.6 for the Japanese and 26.0 for the Americans. A cardiovascular history questionnaire revealed that Americans had a higher prevalence of hypertension and effort pain and a ninefold excess of "possible infarction" compared with the Japanese, who had a higher prevalence of diabetes.

86–0478. Cutler, J.A.; Neaton, J.D.; Hulley, S.B., et al. **Coronary Heart Disease and All-Causes Mortality in the Multiple Risk Factor Intervention Trial: Subgroup Findings and Comparisons With Other Trials.** *Preventive Medicine* 14(3):293-311, May 1985.

The Multiple Risk Factor Intervention Trial (MRFIT) reports substantially different smoking cessation rates between special intervention (SI) and usual care (UC) groups at 7-year followup. MRFIT is a randomized primary prevention trial designed to test whether SI to reduce coronary heart disease (CHD) risk factors can lower CHD mortality in middle-aged men at above average risk. At randomization, 59 percent of participants smoked compared with 32 percent of SI and 46 percent of UC men at followup, representing net cessation rates of 46 and 23 percent, respectively ($p<0.01$). Other risk factor levels were reduced substantially more in SI than UC men; however, SI-UC differences in CHD mortality (7.1 percent) and total mortality (-2.1 percent) were not statistically significant. Smoking cessation and serum cholesterol reduction were significantly associated with reduction in risk for CHD mortality in the SI group ($p<0.05$); smoking cessation was associated with a 53.8 percent reduction in CHD mortality risk ($p<0.01$). Further MRFIT results are summarized and subgroup results are compared with findings of other major trials.

86–0479. Doyle, A.E. **Cardiovascular Morbidity and Mortality in Mild Hypertension: The Australian Trial.** *Journal of Cardiovascular Pharmacology* 7(Supplement 2):S10-S13, 1985.

A higher incidence of morbidity and mortality occurred in smokers than in nonsmokers, especially in those with low body weights. Treatment benefited thin smokers most, and effects of treatment seemed to be reduced in those with higher serum cholesterol levels. Mildly hypertensive patients on hypertensive drugs for periods of up to 6 years had a lower incidence of death and nonfatal cardiovascular events than patients on placebos (controls). The Australian Therapeutic Trial in Mild Hypertension studied 1,721 active and 1,706 placebo patients (diastolic blood pressure 95 to 109, aged 35 to 65) matched for sex, smoking habits, serum cholesterol, and physical characteristics. Univariate analysis of possible prognostic factors at study entry showed higher incidence of trial endpoints (mostly events owing to ischemic heart disease and cerebrovascular disease) in older subjects, men, cigarette smokers, those with higher systolic blood pressures, and thinner subjects. Lower incidence occurred in actively treated people than in control subjects at each level of incidence of each covariate measured. Treatment benefit was greatest in people with lower systolic blood pressures and lower serum cholesterol levels. Multivariate regression analyses confirmed that incidence of trial endpoints increased with age and with systolic blood pressures. (Auth. Abs. Mod.)

86–0480. Galea, G.; Davidson, R.J.L. **Haematological and Haemorheological Changes Associated With Cigarette Smoking.** *Journal of Clinical Pathology* 38(9):978-984, September 1985.

Hematological and hemorrheological changes associated with cigarette smoking in 12 male and 8 female smokers (age range 27 to 67 years) were reversed, or partly reversed, with cessation of smoking. The heavy chronic smokers (15 to 60 cigarettes/day for 15 to 45 years) were compared with 20 nonsmoking controls matched for sex and age. Highly significant differences were observed in whole blood viscosity, plasma viscosity, plasma fibrinogen concentrations, packed cell volume, and carboxyhemoglobin concentrations between smokers and nonsmokers. Ten subjects followed up for 2 weeks after cessation of smoking showed significant improvement in whole blood viscosity and carboxyhemoglobin concentrations and indications of improvement in all other measurements. After 2 months, all measured variables in two subjects were comparable with those in nonsmokers. No correlation could be established between carboxyhemoglobin concentration and any of the other variables. Although patients' compliance may be difficult to obtain, further prospective studies are recommended to confirm findings. (Auth. Abs. Mod.)

86–0481. Gofin, R.; Lewis, B.S.; Kark, J.D., et al. **Treadmill Exercise Testing in a Middle-Aged Jerusalem Population Sample.** *Israel Journal of Medical Sciences* 21(7):584-594, July 1985.

Data on treadmill exercise performance in a middle-aged Jerusalem population showed few differences between smokers and nonsmokers of either sex. However, among those who attained the target heart rate (THR), smokers of both sexes performed longer than nonsmokers (men, $p=0.025$; women, $p=0.045$). The physical capacity of 1,043 men and 597 women was studied. Apparently healthy participants underwent a graded treadmill exercise test (88 percent of men and 87 percent of women). Exercise was terminated when a heart rate of 85 to 90 percent of the predicted maximal heart rate was achieved (or when the person could not continue for other reasons, mainly fatigue or weakness). Exercise performance was assessed according to time on the treadmill. THR was achieved by 637 men (69 percent) and 288 women (56 percent). Time to THR was longer in men (10.8 minutes) than in women (8.8 minutes). Those who attained THR were younger and leaner, smoked less, exercised more, and had somewhat higher HR and lower systolic and diastolic blood pressure. Persons who successfully performed the graded exercise test were younger and leaner, had lower heart rate and lower systolic and diastolic blood pressure. There were also fewer smokers in the group.

86–0482. Hillbom, M.; Muuronen, A.; Lowbeer, C., et al. **Platelet Thromboxane Formation and Bleeding Time Is Influenced by Ethanol Withdrawal But Not by Cigarette Smoking.** *Thrombosis and Haemostasis* 53(3):419-422, June 24, 1985.

Platelet count, mean volume, aggregation, and associated thromboxane (TXB$_2$) formation, circulating platelet aggregates and bleeding time were examined in 19 noncirrhotic male alcoholic cigarette smokers for 4 weeks following cessation of prolonged heavy drinking, and in 24 nonalcoholic healthy male volunteers (10 smokers and 14 nonsmokers). The alcoholics showed a ninefold increase ($p<0.001$) in adenosine diphosphate-stimulated platelet thromboxane formation 1 to 2 weeks after ethanol withdrawal. The effect was transient and coincided with a significant ($p<0.01$) shortening of skin bleeding time and a slight increase in circulating platelet aggregates suggesting proneness to thrombosis. All of the alcoholics were smokers. However, no differences between smokers and nonsmokers were seen in the healthy volunteers. It is concluded that the recovery phase after prolonged heavy drinking is characterized by a transient increase in platelet reactivity, which may lead to increased spontaneous formation of circulating platelet aggregates and shortening of bleeding time. (Auth. Abs. Mod.)

86–0483. Hypertension Detection and Follow-Up Program Cooperative Research Group. **Mortality Findings for Stepped-Care and Referred-Care Participants in the Hypertension Detection and Follow-Up Program, Stratified by Other Risk Factors.** *Preventive Medicine* 14(3):312-335, May 1985.

Mortality rates for smokers and nonsmokers in the Hypertension Detection and Follow-up Program (HDFP) were lower in stepped care (SC) than in referred care (RC), according to 5-year data on 10,940 black and white men and women in the 30 to 54 and 55 to 69 age groups. Five-year mortality was consistently higher for smokers at baseline in both care groups. Overall, SC adjusted mortality rate was 17 percent lower than RC rate in nonsmokers and 15 percent lower in smokers. Absolute differences in mortality rates in favor of the SC group were 10 and 15/1,000 in 5 years, respectively. The SC-RC difference in mortality was consistent by χ^2 test for smokers and nonsmokers, and was highly significant ($p=0.008$) after adjustment for baseline smoking status. People with diastolic blood pressure of 90 to 104 mm Hg and not on antihypertensive drugs at baseline had 24 percent lower mortality rates in the SC group (compared with 16 percent in the RC group). Absolute differences in adjusted rates were 13 and 16/1,000, respectively. The SC-RC mortality difference was homogeneous by χ^2 test for smokers and nonsmokers and significant ($p=0.03$) after adjustment for baseline smoking status. Findings indicate the benefit of vigorous antihypertensive stepped-care treatment and the need for comprehensive management of people with high blood pressure to control hypertension and other risk factors having negative impact on long-term prognosis. (Auth. Abs. Mod.)

86–0484. Janzon, L.; Franzen, J.; Lindell, S.-E., et al. **Blood Lipid Variability in Relation to Relative Weight and Biochemical Markers of Tobacco and Alcohol Consumption.** *Postgraduate Medical Journal* 61(716):505-508, June 1985.

Smoking had little long-term effect on blood lipids in a reliability study of carboxyhemoglobin (COHb) and gamma-glutamyl-transferase (GGT) used as objective indicators of tobacco and alcohol consumption. The relationship between COHb, GGT, and body weight, cholesterol, triglyceride, and apolipoprotein AI (Apo-AI) was assessed through statistical analysis of data on 1,035 middle-aged men (mean 48 years) participating in a health screening and intervention program. COHb, GGT, and relative body weight accounted for 4, 16, and about 10 percent of cholesterol, triglyceride, and Apo-AI variability, respectively. Although statistically significant, the influence of COHb on cholesterol and triglycerides was found to be clinically insignificant. GGT and body weight each had a significant influence on cholesterol and triglycerides. GGT had a positive correlation to Apo-AI, while body weight had a negative correlation to Apo-AI. (Auth. Abs. Mod.)

86–0485. Jeremy, J.Y.; Mikhailidis, D.P.; Dandona, P. **Cigarette Smoke Extracts, But Not Nicotine, Inhibit Prostacyclin (PGI_2) Synthesis in Human, Rabbit, and Rat Vascular Tissue.** *Prostaglandins, Leukotrienes and Medicine* 19(3):261-270, September 1985.

Ethanolic and aqueous cigarette smoke extracts and nicotine were tested for influence on prostacyclin (PGI_2) synthesis in four vascular models: human umbilical artery, rabbit aorta, rat aorta, and rat lung. In each tissue, a dose-dependent inhibition of PGI_2 release (assessed by measurement of immunoreactive 6-oxo-$PGF_1\alpha$, the stable hydrolysis product of PGI_2) was seen on incubation with aqueous or ethanolic cigarette smoke extracts. Nicotine, at concentrations of ≤ 1 g/L, was without effect. In vitro conversion of (^{14}C)-arachidonic acid to (^{14}C)-6-oxo-$PGF_1\alpha$ by human umbilical artery was also inhibited by both ethanolic and aqueous cigarette smoke extracts, but nicotine was again without effect. It was concluded that cigarette smoke inhibits PGI_2 synthesis at the level of cyclooxygenase or beyond, and that components other than nicotine are responsible for this effect. In blood vessels, the inhibition of PGI_2 synthesis may contribute to the pathogenesis of the vascular complications of smoking. (Auth. Abs.)

86–0486. Kagan, A.; Popper, J.S.; Rhoads, G.G., et al. **Dietary and Other Risk Factors for Stroke in Hawaiian Japanese Men.** *Stroke* 16(3):390-396, May-June 1985.

Ten-year followup data on 7,895 Japanese men living on the island of Oahu showed that cigarette smoking was significantly associated with stroke. Subjects in the longitudinal study were aged 45 to 68 and free of evidence of stroke at entry. During followup, 154 men developed thromboembolic stroke, 65 intracranial hemorrhage, and 19 stroke of unknown type; 79 deaths were attributed to stroke. In addition to cigarette smoking, risk factors for thromboembolic stroke were elevated blood pressure, glucose intolerance, age, electrocardiographic evidence of left ventricular hypertrophy or strain, and proteinuria. Attributes associated with increased risk of intracranial hemorrhage (other than smoking) were age, elevated blood pressure, and serum uric acid, and inversely, serum cholesterol level. Electrocardiographic evidence of left ventricular hypertrophy or strain significantly increased risk of cerebral hemorrhage, but was not associated with subarachnoid hemorrhage. In univariate analysis, there was an inverse relationship between dietary fat intake and thromboembolic and total stroke incidence and also between protein intake and total stroke incidence. Dietary factors were not significant in multivariate analysis. No relationship was found between salt intake and incidence of stroke. (Auth. Abs. Mod.)

86–0487. Kannel, W.B.; Schatzkin, A. **Sudden Death: Lessons From Subsets in Population Studies.** *Journal of the American College of Cardiology* 5(6):141B-149B, June 1985.

Effects of smoking on sudden death, which claims 300,000 coronary heart disease victims annually in the United States, are discussed in context with other lifestyle behaviors. Cigarette smoking transiently enhances adhesiveness of platelets, lowers the ventricular fibrillation threshold of the heart, accelerates heart rate, causes coronary spasm, and transiently raises blood pressure. Also, the oxygen-carrying capacity of blood is reduced by carboxyhemoglobin accumulation, and tissue oxygen utilization is impaired by myoglobin. Combined with short-term nicotine-induced catecholamine release, such effects could reasonably be expected to induce sudden death. Cigarette smoking in men was strongly related to sudden death in the Framingham study, in which the proportion of sudden coronary deaths tended to increase with number of cigarettes smoked. Other studies suggest that persons who quit smoking reduce the risk of sudden death by half, regardless of duration of prior smoking. In addition to smoking, coronary heart disease accompanies a lifestyle involving an overly fatty diet, unrestrained weight gain, and too little exercise.

86–0488. Karasev, A.V.; Agapov, A.A.; Prokhorov, A.V., et al. **Zdorovyy Obraz Zhizni kak Osnova Profilaktiki Serdechno-Sosudistykh Zabolevaniy u Molodyezhi. [Healthy Mode of Life as a Basis for the Prevention of Cardiovascular Diseases in the Young.]** *Sovetskoye Zdravookhraneniye* 7:13-16, July 1985, Russian.

Many behaviors, including smoking, that contribute to cardiovascular disease in later life are established in childhood and continue into early adulthood. According to data from the Moscow Institute of Preventive Cardiology, 62.2 percent of men and 21.2 percent of women between the ages of 20 to 29 are smokers, and 2 percent of the men have been diagnosed as having ischemic heart disease. A survey of schoolchildren showed 7.4 percent of 11-year-olds and 44.3 percent of 16-year-olds smoke. More than 20 percent of young females smoke by the age of 16. Smoking is prevalent in higher technical schools (25.3 percent males, 3.21 percent females) and in medical schools (26.9 percent males, 8.8 percent females). Abnormal blood pressure was found in 4,000 of 17,000 schoolchildren (aged 12 to 13). It is predicted that in 40 percent of these cases, elevated blood pressure will continue into adulthood. Physical activity has been proved effective in reducing stress, obesity, and other risk factors that lead to cardiovascular disease. It is recommended that a healthy lifestyle that includes physical activity be promoted by health professionals, social organizations, and work collectives through availability of health clubs, sports complexes, gymnasiums, and other facilities.

86-0489. Kelly, T.L.; Gilpin, E.; Ahnve, S., et al. **Smoking Status at the Time of Acute Myocardial Infarction and Subsequent Prognosis.** *American Heart Journal* 110(3):535-541, September 1985.

Smoking is a risk factor for cardiovascular disease and may contribute to the occurrence of acute myocardial infarction (AMI) at a younger age; however, smoking at the time of AMI does not appear to be an independent predictor of death during the first year after AMI. To determine whether smoking status at the time of AMI is related to death after 1, 6, and 12 months, 2,133 patients with AMI were followed for 1 year. The 1,247 smokers were an average of 10 years younger than nonsmokers ($p<0.001$) and had a lower prevalence of hypertension ($p<0.01$), congestive heart failure ($p<0.0001$), angina pectoris ($p<0.01$), and diabetes ($p<0.0001$). Smokers also had less severe myocardial infarction, as evidenced by a lower prevalence of pulmonary congestion on chest x ray ($p<0.01$). Mortality at 1, 6, and 12 months was lower in smokers ($p<0.0001$, $p<0.05$, $p<0.01$, respectively). Adjusting for age and other variables reduced but did not reverse the survival differential favoring smokers at 1 month, but adjusting for age alone eliminated the mortality rate differences at 6 and 12 months. (Auth. Abs. Mod.)

86-0490. Kishk, Y.T.; Trowbridge, E.A.; Martin, J.F. **Platelet Volume Subpopulations in Acute Myocardial Infarction: An Investigation of Their Homogeneity for Smoking, Infarct Size and Site.** *Clinical Science* 68(4):419-425, April 1985.

Large mean platelet volume and low count did not appear to be statistically linked to smoking in acute myocardial infarction (AMI) patients, but mean platelet volume was significantly larger in the AMI group than in patients with ischemic heart disease or in an asymptomatic (AS) group of young men. Mean platelet volume and count were measured in patients with AMI, a control group with myocardial ischemia but not infarction, and the AS group. Two subpopulations were present within the MI group. One subgroup had a large mean platelet volume and low count; the other subpopulation was indistinguishable from the IHD group with regard to platelet count and mean volume from the IHD group. Over 60 percent of MI patients had high platelet volume and low count compared with 13 percent of the IHD group and 38 percent of the AS group. AMI is likely to be associated with a large mean platelet volume and low count compared with the IHD group, but there is no statistical evidence that this condition is related to smoking or size and site of infarct. Based on evidence, it is suggested that large mean platelet volume and low platelet count could be a major risk factor for MI. (Auth. Abs. Mod.)

86-0491. Lomuscio, A.; Vita, A.; Misrachi, D. **Echocardiographic Alterations in Smokers.** *IRCS Medical Science* 12(8):664, 1984.

An increase in left ventricular mass was seen in smokers in a study to determine whether the left ventricle is altered by smoking in otherwise healthy humans. However, morphologic alterations did not appear to depress left ventricular function. The six male and four female smokers were matched with five female and five male nonsmokers to study left ventricular function and morphology using M-mode echocardiography. Septum thickness and left ventricular posterior wall thickness values were statistically higher among smokers than nonsmokers ($p<0.005$ and $p<0.001$, respectively). Increase of left ventricular mass in smokers may be caused by the same mechanism proposed for animals; namely, increased synthetic activity of fibroblasts in the interstitium of some muscular tissues without evident loss of myofibers as a result of long-term exposure to cigarette smoke. A collagen accumulation in the middle layer of the myocardium occurs in animals, causing increase in left ventricular mass with no evidence of hypertrophy or inflammation. Data on humans indicate left ventricular function is not depressed despite morphological alterations. Further study is needed to determine whether this is the result of an insufficient quantity of cigarettes smoked, insufficient time of exposure to smoke, or some other factor.

86-0492. Lubawy, W.C.; Valentovic, M.A. **Chronic Exposure to High Levels of Sidestream Smoke Adversely Alters ^{14}C-Arachidonic Acid Metabolism in Rat Platelets and Aortas.** *Prostaglandins, Leukotrienes and Medicine* 19(2):131-132, August 1985.

Chronic exposure to mainstream cigarette smoke causes alterations in PGI_2 and TXA_2 production and may be the mechanism by which smoking increases risk of cardiovascular disease. Decreases in aortic PGI_2 and increases in platelet TXA_2 occur in disorders in which atherosclerosis is a common complication. Chronic sidestream smoke inhalation was investigated to determine whether it also could cause alterations in PGI_2 and TXA_2 production. Male Sprague-Dawley rats were exposed to low, medium, and high concentrations (10, 25, and 50 percent) of sidestream smoke for 20 weeks. Blood samples were taken periodically to determine percent of carboxyhemoglobin (COHb). COHb levels in animals exposed to whole mainstream smoke, or 10, 25, and 50 percent sidestream smoke were 8.3±0.4, 4.8±0.5, 11.3±0.9, and 18.6±1.2 percent, respectively. Sidestream smoke exposure caused dose-related increases in platelet TXA_2, while maximal decreases in aortic PGI_2 occurred at the lowest level of sidestream smoke exposure. Sidestream smoke produced changes in aortic PGI_2 and platelet TXA_2 similar to that caused by mainstream smoke, even though they differ quantitatively. It is suggested that continuous exposure to high concentrations of sidestream smoke at levels resulting in COHb values similar to those seen in smokers may also increase risk of cardiovascular disease.

86-0493. Lynch, P. **Coronary Risk Profile of Young Soldiers With Coronary Heart Disease.** *Journal of the Royal Army Medical Corps* 131(1):38-41, February 1985.

A high prevalence of heavy cigarette smoking was found to be the major factor contributing to high coronary heart disease (CHD) mortality rates in a retrospective study of coronary risk factors in young British Army soldiers with CHD. The 164 male soldiers (under the age of 40 years) were diagnosed with CHD between 1976 and 1981. Of the 114 for whom tobacco habit information was available, 110 were smokers; all but 5 smoked cigarettes. The majority of cigarette smokers (89 percent) consumed >20 cigarettes/day, 40 percent smoked 30 or more, and 24 percent smoked 40 or more. Assuming that the 50 men for whom no smoking data were available were nonsmokers, the smoking prevalence of 67 percent that would result is greater than the 60 percent smoking prevalence reported in the British Army. Both are considerably higher than the 1980 civilian figure of 45 percent. The men with CHD also had higher cholesterol levels and were more obese than controls. The high smoking prevalence, thought to be related to the reduced cost of cigarettes to soldiers, overwhelms any expected protective effect of physical fitness achieved through army training.

86-0494. McKeigue, P.M.; Adelstein, A.M.; Shipley, M.J., et al. **Diet and Risk Factors for Coronary Heart Disease in Asians in Northwest London.** *Lancet* 8464(2):1086-1089, November 1985.

High coronary heart disease mortality rates and low incidence of colon cancer among 540 Asian immigrants to England and Wales were not explained by diet and coronary disease risk factors. Asians smoked less (34 percent of males, 1 percent of females) than the general British population (38 percent males, 33 percent females), and consumed less alcohol. Among Asians, 49 percent of males and 91 percent of females were classified as abstainers or occasional drinkers compared with 16 percent of British males and 35 percent of British females. Asians also consumed less saturated (S) fat and cholesterol and more polyunsaturated (P) fat and vegetable fiber. The P/S ratio of the Asians' diet was 0.85 compared with 0.28 in the British population (based on linoleic acid content of plasma lipids). Plasma total cholesterol and high density lipoprotein cholesterol of Asian men was similar to that of a British comparison group; concentrations in Asian women were much lower than in British women. The survey of diet and coronary risk factors in an Asian community in northwest London used methods similar to those of the National Food Survey for comparison with British subjects. Lifestyle information was obtained by bilingual questionnaires from Gujaratis, Punjabis, Southerners, and Muslims of Indian origin. (Auth. Abs. Mod.)

86-0495. Miettinen, T.A.; Huttunen, J.K.; Naukkarinen, V., et al. **Multifactorial Primary Prevention of Cardiovascular Diseases in Middle-Aged Men. Risk Factor Changes, Incidence, and Mortality.** *Journal of the American Medical Association* 254(15):2097-2102, October 18, 1985.

Results of a 5-year multifactorial primary prevention trial designed to reduce incidence of smoking, vascular disease, hyperlipidemias, hypertension, obesity, and abnormal glucose tolerance in persons at high risk for cardiovascular diseases are described. The 1,222 healthy volunteers, aged 40 to 55 years with one or more risk factors, were divided into three groups: (1) high risk intervention ($n=612$), (2) high risk control ($n=610$), and (3) low risk control ($n=593$). Intervention group subjects met with a study investigator every 4th month during followup and were given advice to quit smoking, alter diets, and increase physical activity. In the intervention, high risk control, and low risk control groups at baseline, 24.8, 24.1, and 1.4 percent, respectively, were smokers (average, 8, 8, and 2 g tobacco/day). After 5 years, tobacco consumption had decreased an average of 3, 2, and 0 g/day, respectively. The difference between the intervention and high risk control group was significant ($p<0.01$), as was the degree of change within each group ($p<0.01$). Multivariate analysis of entry data showed smoking and hypercholesterolemia were significant predictors of coronary events during the study period ($p<0.05$).

86-0496. Notelovitz, M.; Levenson, I.; McKenzie, L., et al. **The Effects of Low-Dose Oral Contraceptives on Coagulation and Fibrinolysis in Two High-Risk Populations: Young Female Smokers and Older Premenopausal Women.** *American Journal of Obstetrics and Gynecology* 152(8):995-1000, August 15, 1985.

Results indicate that use of oral contraceptives by young smokers may initiate biochemical changes that favor thrombogenesis. Effects of low-dose oral contraceptives on blood coagulation and the inhibitory system of coagulation were investigated in 22 young healthy women who were moderate to heavy smokers (mean 25±15 cigarettes/day) and 15 healthy nonsmoking women between the ages of 34 and 41. Smokers showed statistically significant procoagulant alterations related to oral contraceptive use, including increased prothrombin time ($p=0.009$), decreased thrombin time ($p=0.03$), and decreased concentrations of fibrinogen antigen ($p=0.004$). Antithrombin III antigen and activity were also significantly reduced ($p=0.03$ and $p=0.005$, respectively), whereas plasminogen antigen and activity were significantly increased ($p=0.01$ and $p=0.001$, respectively). In women over the age of 34, oral contraceptive use was associated with an increase in plasminogen antigen and activity ($p=0.01$ and $p=0.001$, respectively) and a significant decrease in α_2-antiplasmin activity ($p=0.007$). Contraceptive use by nonsmoking older women appears to enhance fibrinolysis, has a minimal procoagulant effect, and has no effect on inhibition of coagulation. (Auth. Abs. Mod.)

86-0497. Petitti, D.B.; Friedman, G.D. **Cardiovascular and Other Diseases in Smokers of Low Yield Cigarettes.** *Journal of Chronic Diseases* 38(7):581-588, 1985

Risks of cardiovascular disease, cancer of the trachea, bronchus, and lung, and of all smoking-related cancers were higher in smokers of low-yield cigarettes than in people who never used tobacco, according to a 4-year followup analysis of 16,270 current, regular cigarette smokers and 42,113 nonusers. In multivariate analyses that included age, sex, race, number of cigarettes smoked/day, and other cardiovascular risk factors, the smoking-related risk of cardiovascular diseases was consistently higher in smokers of higher yield cigarettes than in smokers of lower yield cigarettes, although the magnitude of difference in risk was small. Risk of cancer of the trachea, bronchus, and lung, of all smoking-related cancers as a group, of diseases of the respiratory system, and of peptic ulcer diseases was not significantly associated with yield of cigarettes smoked. It is concluded that smoking low-yield cigarettes is not without associated hazard; however, smokers who cannot quit should try to smoke the fewest number of the lowest yield cigarette. (Auth. Abs. Mod.)

86-0498. Puddey, I.B.; Vandongen, R.; Beilin, L.J., et al **The Effect of Stopping Smoking on Blood Pressure—A Controlled Trial.** *Journal of Chronic Diseases* 38(6):483-493, 1985.

Cessation of smoking caused no significant change in blood pressure over a 6-week period in 33 smokers following entry into a smoking cessation program. Epidemiological studies have found evidence of lower blood pressure in smokers and have predicted an increase in blood pressure after cessation of smoking. Blood pressure changes in participants were monitored and compared with blood pressures in 33 matched controls who continued normal smoking habits. Participants ranged in age from 24 to 63 years and averaged >20 cigarettes/day. Fourteen subjects were successful in quitting smoking for the entire 6 weeks, 13 were unsuccessful, and 6 withdrew before completing the program. No significant increase in supine or erect systolic or diastolic blood pressure was observed following reduction or cessation of smoking. A significant reduction was seen in both plasma and salivary thiocyanate and expired air carbon monoxide after successful smoking cessation. Complete cessation of smoking, however, was associated with an increase in weight and in anxiety level and a decrease in alcohol consumption. Long-term cessation, with more prolonged exposure to environmental stress, may ultimately result in higher blood pressure, especially if coupled with further weight gain in hypertensive subjects. (Auth. Abs. Mod.)

86-0499. Puska, P.; Nissinen, A.; Tuomilehto, J., et al. **The Community-Based Strategy to Prevent Coronary Heart Disease: Conclusions from the Ten Years of the North Karelia Project.** *Annual Review of Public Health* 6:147-193, 1985.

Smoking among Finnish (North Karelia) men aged 25 to 59 declined from 52 percent in 1972 to 38 percent in 1982, a net reduction over the reference area of 27 percent ($p<0.001$). The North Karelia Project was founded as a response to the burden of heart disease in the community. A quasi-experimental design was used to measure whether changes in health behavior and risk factors would lead to changes in coronary heart disease rates. Changes in the North Karelian population were compared with respective changes in a matched reference area to determine net changes. The estimate of effect is conservative, because the project probably also influenced the reference area. Overall, reductions in risk factors in North Karelia were substantial. Influencing health-related behaviors and risk factors is not easy, even when the health hazards are well known. However, the results presented indicated that, at least in favorable conditions, a comprehensive, determined, and well-planned activity can lead to substantial improvements in risk factor patterns. Evaluation suggests that success was not based primarily on increased health knowledge or changes in health-related attitudes. Rather, broad-ranged community organization (including provision of primary health care services and involvement of various other community organizations) was of central importance, creating a social atmosphere more favorable to change. In addition to an evaluation of the 10-year results, the report provides a history and organization of the project; theoretical framework (medical and epidemiological framework and behavioral/social framework); and main project components (planning, implementation of the intervention program, and evaluation). It is concluded that well-conceived commmunity-based programs have an important impact on lifestyles and risk factor levels in the population. With a sustained program it is also possible to maintain these more favorable levels over a long period. Such changes result in reduced rates of cardiovascular disease and improved health and well-being among the entire population. A major community-based intervention study can also act as a powerful demonstration project to enhance nationwide reductions in risk factors and control of the cardiovascular disease epidemic.

86-0500. Ronnevik, P.K.; Gundersen, T.; Abrahamsen, A.M. **Effect of Smoking Habits and Timolol Treatment on Mortality and Reinfarction in Patients Surviving Acute Myocardial Infarction.** *British Heart Journal* 54(2):134-139, August 1985.

Cessation of smoking combined with timolol treatment have an additive effect in reducing mortality and reinfarction rate after myocardial infarction (MI). The Norwegian Multicenter Group studied smoking habits before and after MI and the relationship to mortality and reinfarction rate after treatment with timolol in patients surviving acute MI. Of 1,884 patients, 945 were randomized to treatment with timolol (752 men and 193 women), and 939 to treatment with placebo (732 men and 207 women). Mean followup period was 17.3 months (range 12 to 33). No relationship was found between initial smoking habits and risk category after MI or between initial smoking habits and later outcome. At the time of first infarct, smokers were 7 years younger than nonsmokers. One month after MI, nearly 60 percent of the smokers had quit completely. A significantly lower incidence of early cardiac death and lower total mortality was found in patients treated with timolol in both continuing smokers and the combined nonsmoking groups. A significantly lower reinfarction rate was also observed among nonsmokers. Cessation of smoking alone was associated with a 45 percent reduction in reinfarction rate and a 26 percent reduction (nonsignificant) in mortality rate. (Auth. Abs. Mod.)

86–0501. Shirlow, M.J.; Mathers, C.D. **Caffeine Consumption and Serum Cholesterol Levels.** *International Journal of Epidemiology* 13(4):422-427, December 1984.

A significant positive interaction between smoking and caffeine consumption and serum cholesterol levels was found for females in a cross-sectional study of 4,757 Australians. Confounding factors that were considered included alcohol use, smoking, occupation, oral contraceptives, age, sex, and adiposity. Caffeine consumption was significantly associated with serum cholesterol levels in women, but not in men. Use of caffeinated coffee by men, but not total caffeine consumption rate, was significantly associated with raised serum cholesterol. After adjusting for age and adiposity, mean serum cholesterol level was 11 mg/dL higher for women consuming 200 mg or more of caffeine/day than in women who consumed less. Relative risk of high serum cholesterol (>260 mg/dL) was greater than 2 for women consuming 200 mg or more of caffeine/day. Results suggest that the interaction of smoking and caffeine is confined to women and that there is no association between caffeine consumption and serum cholesterol levels in men. (Auth. Abs. Mod.)

86–0502. Tell, G.S.; Grimm, R.H., Jr.; Vellar, O.D., et al. **The Relationship of White Cell Count, Platelet Count, and Hematocrit to Cigarette Smoking in Adolescents: The Oslo Youth Study.** *Circulation* 72(5):971-974, November 1985.

White blood cell count (WBC) and platelet count (PC) were increased in adolescents smoking relatively recently, indicating that a WBC increase observed in smokers may not be the result of longstanding smoking-induced chronic disease conditions. Relationship of cigarette smoking, WBC, PC, and hemotocrit were studied in Norwegian adolescents as part of the Oslo Youth Study (an investigation of risk factors and behaviors for cardiovascular disease and cancer among adolescents). Analyses of covariance, controlling for height, weight, age, sexual maturation, high density lipoprotein (HDL) cholesterol, and hemotocrit, revealed that both male and female regular smokers (at least once a week) had significantly higher WBCs. Male regular smokers had significantly higher PCs than nonsmokers, and female regular smokers had higher PCs than young women who smoked less often than once a month. Hematocrit, after adjustment for height, weight, age, sexual maturation, and HDL cholesterol, was significantly lower in male regular smokers, while female regular smokers had higher hematocrit values than nonsmokers or occasional smokers. (Auth. Abs. Mod.)

86–0503. Ulvenstam, G.; Aberg, A.; Pennert, K., et al. **Recurrent Myocardial Infarction. 2. Possibilities of Prediction.** *European Heart Journal* 6(4):303-311, April 1985.

Cessation of smoking proved to be a significant predictor of recurrent myocardial infarction (MI) in a followup study of 1,306 men (82.1 percent smokers) under 68 years of age who had survived a first MI. The etiologic fraction (percent of infarctions predicted by index developed in the study) was only 24 percent when smoking as a causative factor was disregarded, but increased to 44 percent when smoking was taken into account. Patients were randomly divided into two groups (one for derivation of predictive models and the other for validation only) and were followed up for 2 to 12 years (mean 6.5 years). Common clinical variables judged prognostically important, such as history of hypertension, angina pectoris, or diabetes before MI and maximal serum ASAT during MI, were independently related to reinfarctions during followup. A predictive index was formed and validated. The rate of reinfarction among risk quartiles in the validation sample increased from 24 to 38 percent ($p=0.003$) with an etiologic index of 24 percent. During followup, only cessation of smoking after MI had independent predictive power, and a new predictive index including this variable was formed and validated. The reinfarction rate in risk quartiles increased from 15 to 39 percent ($p<0.001$) with an etiologic index of 44 percent. When only reinfarctions occurring before 21 months' followup were considered, the etiologic index was 62 percent. (Auth. Abs. Mod.)

86–0504. Walle, T.; Byington, R.P.; Furberg, C.D., et al. **Biologic Determinants of Propranolol Disposition: Results From 1308 Patients in the Beta-Blocker Heart Attack Trial.** *Clinical Pharmacology and Therapeutics* 38(5):509-518, November 1985.

Smoking and a combination of other factors (sex, race, age, drugs, and diet) accounted for interindividual variability in disposition of propranolol after myocardial infarction (MI) in 1,308 patients participating in a Beta-Blocker Heart Attack trial. A steady-state propranolol dose of 40 mg every 8 hours produced a mean trough concentration of 42 ng/mL with a fiftyfold interindividual variability. Nonsmokers had slightly higher serum propranolol levels at baseline than cigarette smokers (43.8 vs. 40.0 ng/mL), who had lower propranolol levels across all four age groups (30 to 69 years). Data showed that age was clearly associated with elevated serum propranolol levels in both smokers and nonsmokers. Serum levels were higher in women, in older patients, and in patients receiving concomitant therapy with other antiarrhythmic drugs. Serum levels were also higher in patients with elevated serum creatinine and lactate dehydrogenase levels. Black patients had lower serum levels than white patients. Although a genetic deficiency in the oxidative metabolism of propranolol has been indicated, the frequency distribution of serum propranolol levels did not demonstrate a bimodal distribution for genetically distinct populations. (Auth. Abs. Mod.)

86–0505. Wilson, P.W.F.; Garrison, R.J.; Castelli, W.P. **Postmenopausal Estrogen Use, Cigarette Smoking, and Cardiovascular Morbidity in Women Over 50. The Framingham Study.**

New England Journal of Medicine 313(17):1038-1043, October 24, 1985.

In 1,234 women (282 smokers) aged 50 to 83 years, postmenopausal estrogen use was associated with increased incidence of stroke ($p<0.05$) in nonsmokers. However, among smokers taking estrogens, there was a significantly higher risk of myocardial infarction, angina pectoris, coronary heart disease, and total cardiovascular disease. Smoking habits did not influence risk of cerebrovascular disease or mortality, nor were differences in mortality from cardiovascular disease or all causes observed between estrogen users or nonusers. For certain cardiovascular end-points, an apparent interaction was observed, with large differences between the adjusted relative risk for estrogen use in smokers compared with nonsmokers.

86–0506. Yevdokimova, Ye.V.; Yevdokimov, V.G. **Gipertenzivnyi Tip Reaktsii Arterial'novo Davleniya na Fizicheskuyu Nagruzku i Yevo Svyaz' s Nekotorymi Faktorami Riska Ishemicheskoi Bolezni Serdtsa u Zdorovykh Lits Molodovo Vozrasta. [The Hypertensive Type of the Arterial Pressure Response to Exercise and Its Relationship With Some Risk Factors of Coronary Heart Disease in Clinically Normal Young Individuals.]** *Kardiologiya* 25(6):64-67, 1985, Russian.

Hypertensive blood pressure response to exercise was associated with smoking and other coronary heart disease (CHD) risk factors among 1,005 healthy young people (aged 17 to 29 years) of both sexes. Response was higher in individuals with a history of hypercholesterolemia, hereditary inclination toward CHD, hypertension, smoking, alcohol consumption, and excessive body weight. Hypertensive reaction was found in 270 (37.9 percent) of 713 males and in 38 (13.0 percent) of 292 females. Incidence increased with age in those aged 17 to 29 years. Incidence was statistically higher among men in all age groups: 17 to 19 years, 26.0±4.4 percent compared with 7.5±3.2 percent among women ($p<0.001$); 20 to 24 years, 35.0±2.5 and 9.1±2.5 percent, respectively ($p<0.001$); and 25 to 29 years, 47.1±3.2 and 22.5±4.4 percent, respectively ($p<0.001$). The high incidence of hypertensive response to exercise among young men may be attributed to risk factors such as smoking and alcohol consumption. Frequency of hypertensive type reaction among smokers was 42.1±3.1 percent compared with 24.3±3.3 percent among nonsmokers ($p<0.001$). Frequency among smokers compared with nonsmokers was 27.9±5.7 percent and 23.1±6.7 percent in 17- to 19-year-olds ($p>0.05$), 39.5±2.9 and 18.8±4.4 percent ($p<0.001$) in 20- to 24-year olds, and 50.5±3.6 and 34.0±6.7 percent ($p<0.01$) in 25- to 29-year-olds.

See also **86–0589**

PREGNANCY AND INFANT HEALTH

86–0507. Ahlsten, G.; Ewald, U.; Kindahl, H., et al. **Aggregation of and Thromboxane B_2 Synthesis in Platelets From Newborn Infants of Smoking and Non-Smoking Mothers.** *Prostaglandins Leukotrienes and Medicine* 19(2):167-176, August 1985.

Infants of smokers had significantly lower mean platelet counts in whole blood (327±50 x 10^9/L) than infants of nonsmokers (372±37 x 10^9/L, $p<0.05$); however, the difference in platelet-rich plasma was not statistically significant (729±165 and 762±160 x 10^9/L, respectively). Cord blood platelet aggregation and thromboxane B_2 (TxB_2) synthesis were investigated in 20 healthy infants of 8 smoking and 12 nonsmoking healthy drug-free mothers. No significant differences were observed between the two groups in qualitative or quantitative aggregation responses to stimulation by 0.55, 1.1, 3.3, and 6.6 μmol adenosine diphosphate, 0.5 and 1.0 mmol arachidonic acid, or 1.0 and 5.5 mg/L collagen, and there was no difference in regard to TxB_2 synthesis after stimulation by these substances. Serum levels of thiocyanate, nicotine, and cotinine were significantly higher in cord blood of infants of smokers than of nonsmokers. No significant correlations were observed between TxB_2 level and either of these parameters. Maternal smoking during pregnancy had no demonstratable effect on the prostaglandin-dependent pathway of aggregation of cord blood platelets. (Auth. Abs. Mod.)

86–0508. Aro, T.; Haapakoski, J.; Heinonen, O. **A Multivariate Analysis of the Risk Indicators of Reduction Limb Defects.** *International Journal of Epidemiology* 13(4):459-464, December 1984.

Of 13 risk factors found to be associated with reduction limb defects (RLD), based on bivariate and multivariate analysis, smoking ranked lowest on the maximum likelihood (relative odds) scale: 1.4 (1.3 adjusted) for total RLD, and 2.0 (1.5 adjusted) for isolated RLD. The role of smoking was evaluated in a total study group of 453 confirmed cases of RLD registered with the Finnish Registry of Congenital Malformations from 1964 to 1977. The registry is a national surveillance system for reports of congenital malformations detected in children under 1 year of age. In addition to skeletal reduction defects, 124 cases had malformations in various other organs, prompting the formation of two study subgroups: isolated reduction limb defects and associated reduction limb defects. Analysis showed that high birth order, threatened abortion, low placental weight, low birth weight, previous malformations in the family, influenza during early pregnancy, other infectious diseases, and mother's alcohol consumption during pregnancy were risk indicators associated with defects. (Auth. Abs. Mod.)

86–0509. Browne, M.J.; Eaton, B.M.; Contractor, S.F. **Effect of Nicotine on AIB Transport in the Perfused Human Placenta.** *Contributions to Gynecology and Obstetrics* 13:137-138, 1985.

Low concentrations of nicotine reduced amino acid flow by vasoconstriction from maternal to fetal circulation in perfused human placentas. It is known that heavy smokers have increased incidence of lower birth weight and small-for-gestational age infants. Reduction in uterine blood flow caused by nicotine and chronic hypoxia caused by carbon monoxide are thought to be contributing factors. Lobules of term placentas from nonsmoking women with uncomplicated pregnancies were perfused, establishing a fetal—maternal concentration gradient for the ^{14}C-labelled amino acid α-amino-isobutyric acid (^{14}C-AIB) similar to that found in vivo. In a control group, 14.7 percent of ^{14}C-AIB appeared in fetal perfusate after 2 hours. In those receiving 60 mg nicotine just before ^{14}C-AIB was administered, there was only 6.18 percent.

86–0510. Cnattingius, S.; Axelsson, O.; Eklund, G., et al. **Smoking, Maternal Age, and Fetal Growth.** *Obstetrics and Gynecology* 66(4):449-452, October 1985.

Smoking was the most important risk factor for intrauterine growth retardation (IUGR), and infants of older smokers were more likely to have impaired fetal growth than those of younger smokers. In a prospective clinical study from an unselected area-based population, the influence on birth weight for gestational age (standardized birth weight) was investigated with special respect to risk factors for IUGR. Sixteen percent of the mothers smoked at least 10 cigarettes/day, and influence of smoking on standardized birth weight was highly significant ($p<0.001$). Maternal age had no effect on standardized birth weight; however, among smokers the reduction in standardized birth weight became more pronounced with increasing maternal age ($p<0.001$). Long-term smoking has been reported to increase risk of severe placental complications. Older smokers must be considered to be at higher risk than younger smokers for developing fetal growth disturbances. (Auth. Abs. Mod.)

86–0511. Crawford, D.C.; Morris, D.T.; Fenton, D.W., et al. **Possible Applications of Digital Analysis of Ultrasonic Images of the Placenta.** *Ultrasound in Medicine and Biology* 11(1):79-84, January-February 1985.

Digitized ultrasonic images revealing various textural differences of in vivo placentae at 15 to 18 weeks gestation were analyzed and correlated with smoking, visual appearance, and subsequent development of hypertension. To determine whether placentae differ between smokers and nonsmokers and between normotensive patients and those who subsequently developed hypertension, 70 primigravidae with anterior placentae at approximately 16 weeks gestation (by ultrasound assessment of the biparietal diameter) were studied. No significant textural differences were observed between images of placentae of smokers and nonsmokers, nor did spatially dependent co-occurrence matrices correlate with visual appearance. Textural differences were detected, however, when placentae of the normotensive group were compared with those of patients who subsequently developed latent hypertension in the third trimester of pregnancy. (Auth. Abs. Mod.)

86–0512. Dowsett, S.J. **Smoking Attitudes and Habits During Pregnancy, Sheffield 1983.** *Health Education Journal* 44:83-86, 1985.

Awareness of the risks of smoking during pregnancy was assessed in 206 women after routine antenatal care that was without a special antismoking program. At the beginning of pregnancy, 71 were smokers; 18 quit and 31 reduced consumption during pregnancy. Although 75 percent of smokers remembered receiving advice not to smoke during pregnancy, general practitioners were cited by only 25 percent. Advice, knowledge of the risks of smoking, and partners' smoking habits were not associated with quitting or reducing consumption. A social class gradient was apparent in the proportion of smokers who were aware of the risks of smoking. Among nonsmokers, the higher general level of awareness was not influenced by social class. Although exposed to antismoking information, smokers in social classes IV and V were unlikely to admit to risks of smoking. It is suggested that financial and social pressures may be more potent influences on these groups. (Auth. Abs. Mod.)

86–0513. Harlap, S.; Shiono, P.H.; Ramcharan, S. **Congenital Abnormalities in the Offspring of Women Who Used Oral and Other Contraceptives Around the Time of Conception.** *International Journal of Fertility* 30(2):39-47, 1985.

Women who conceived within 1 month of stopping oral contraceptive (OC) use were not at increased risk of having an infant with congenital malformations, but the risk increased if the woman was a smoker. Congenital abnormalities were studied in 33,545 newborns of women who were members of the Kaiser Health Plan. Ratio of observed to expected cases of major malformations in 850 infants exposed to OCs in utero was 1.24 for infants of nonsmokers and 2.98 ($p=0.028$) for infants of mothers who smoked a pack or more cigarettes/day. In heavy smokers who were 30 years of age or older and had taken oral contraceptives during pregnancy, the relative risk of malformation was 6.09 ($p=0.086$). Major malformations were found in 597 infants (17.8/1,000) and minor malformations in 4,046 infants (120.6/1,000). Rate of major malformations among the 8,522 offspring of mothers who had used oral contraceptives prior to conception were 17.2/1,000 compared with rates of 15.0 and 20.1/1,000 in mothers using other methods of birth control prior to conception. No significant changes in malformation rates were reported following failure of intrauterine devices, spermicides, or rhythm contraception. (Auth. Abs. Mod.)

86–0514. Loris, P.; Dewey, K.G.; Poirier-Brode, K. **Weight Gain and Dietary Intake of Pregnant Teenagers.** *Journal of the American Dietetic Association* 85(10):1296-1305, October 1985.

Although the 34 smokers gained more weight than the 83 nonsmokers in a study of pregnant adolescents (13 to 19 years of age), infants of smokers weighed less at birth than infants of nonsmokers. Smokers gained 40.6±17.5 pounds; nonsmokers gained 36.7±14.8 pounds. Average birth weight for infants of smokers was 3,377±472 g; average weight for infants of nonsmokers was 3,465±431 g. Data on total weight gain and birth weight in relation to age at delivery, gynecologic age, pregravid weight for height, ethnic group, smoking during pregnancy, and marital status were collected from 57 mothers. Mean weight gain (37±16 pounds) and infant birth weight (3,377±480 g) were high. Maternal age was not related to weight gain or birth weight, but infants of subjects with a gynecologic age of less than 3 years were significantly lower in birth weight. Attitude of the father had a positive effect on both weight gain and birth weight. Consumption from all food groups except dark green vegetables was adequate. Mean caloric and protein intakes based on one 24-hour recall/subject were 2,822±1,035 kcal and 110±48 gm, respectively. Mean intakes of all calculated nutrients except iron exceeded the RDAs. Dietary quality was better among subjects attending school programs that placed a greater emphasis on nutrition. (Auth. Abs. Mod.)

86–0515. Martin, J.C. **Perinatal Psychoactive Drug Use: Effects on Gender, Development, and Function in Offspring.** *Nebraska Symposium on Motivation* 32:227-266, 1984.

Stillbirths, low birth weight, slow growth, hyperactivity, and fewer male births were apparent in an investigation of the effects of nicotine and other drugs on gender, development, and function of offspring in rats. Nicotine administered to female rats mimicked physiological and morphological changes found in newborn infants of women who smoke heavily. Nicotine administered either during pregnancy or during pregnancy and the nursing period increased gestational length. Smaller maternal weight gain and significantly lighter individual birth and neonatal weights were noted with fewer live births and increased neonatal death rates. Locomotor activity increased in prepubertal male offspring whose dams received nicotine during gestation and nursing, and hyperactivity persisted throughout their lifespan at various rates. Offspring learned at a slower rate, but eventually learned as well as controls. Fewer male births were observed in eight human and three animal studies as a result of tobacco product ingestion. Experiments that investigated the effects of other sedative and stimulant psychoactive drugs of abuse (alcohol, barbiturates, and amphetamines) are also reviewed.

86–0516. Mochizuki, M.; Maruo, T.; Masuko, K. **Mechanism of Foetal Growth Retardation Caused by Smoking During Pregnancy.** *Acta Physiologica Hungarica* 65(3):295-304, 1985.

Findings suggest that retarded fetal growth in heavy smokers is due to impairment of utero-placental circulation resulting from the vasoconstricting effect of nicotine. Feto-placental function, utero-placental function, and maternal nutritional condition were assessed in pregnant women to clarify the mechanism of retarded fetal growth associated with smoking. Of the 124 women (gestational age over 28 weeks), 59 were smokers (38 moderate, ≤20 cigarettes/day; 21 heavy, >21 cigarettes/day). In heavy smokers, urinary estriol and serum human placental lactogen levels were lower than in nonsmokers. Maternal nutritional status was similar in both groups. In the dehydroepiandrosterone sulfate (DHAS) loading test, heavy smokers showed lower conversion of DHAS to estradiol. In the nonstress test, bradycardia and loss of variability of baseline fetal heart rate were noted after smoking. Levels of cotinine in maternal blood and umbilical cord blood in heavy smokers were markedly higher than in nonsmokers. Microscopic examination showed atrophic and hypovascular changes of placental villi obtained from smokers. (Auth. Abs. Mod.)

86–0517. Pascoe, J.M. **Child Maltreatment and Smoking During Pregnancy. (Letter).** *American Journal of Public Health* 75(12):1452, December 1985.

Mothers' prenatal health behavior can be a partial predictor of subsequent parenting, based on data associating smoking during pregnancy with child maltreatment. In a survey of 201 children born to indigent mothers seen in a community hospital's prenatal clinic, the maltreatment "open case" rate was 15 percent. Factors not related to social service referral included mothers' income (welfare vs. nonwelfare), race, age, marital status, and prenatal social support. Infant admissions to a neonatal intensive care unit were associated with subsequent child maltreatment (31 percent vs. 12 percent). Newborns of mothers who smoked (53 percent, from one-half to one pack of cigarettes/day during pregnancy) were smaller than infants of nonsmokers. Although smoking during pregnancy was not associated with neonatal intensive care unit admissions, it was associated with subsequent referral for child maltreatment, primarily neglect (22.5 percent vs. 7.6 percent).

86–0518. Robitaille, Y.; Kramer, M.S. **Does Participation in Prenatal Courses Lead to Heavier Babies?** *American Journal of Public Health* 75(10):1186-1189, October 1985.

The impact of prenatal courses on birth weight, maternal weight gain, and cigarette smoking was studied in a prospective study of 1,676 primiparous women. Among participants, 44.3 percent smoked prior to pregnancy compared with 56.4 percent of nonparticipants. Participants were also older and of higher socioeconomic status, but reported the same level of daily cigarette consumption as nonparticipants. Without covariate adjustment, newborns of participants had a mean birth weight 127 g heavier than infants of nonparticipants. However, after controlling for confounding factors, differences were not significant. Participants reduced cigarette consumption by an average of 8.7 cigarettes/day; nonparticipants reduced consumption by 5.6 cigarettes/day. Most of the reduction took place in the first trimester of pregnancy. It is concluded that prenatal courses had little or no effect on birth weight, and that other influences were acting to reduce cigarette use in the women.

86–0519. Sandahl, B. **A Prospective Study of Drug Use, Smoking and Contraceptives During Early Pregnancy.** *Acta Obstetricia et Gynecologica Scandinavica* 64(5):381-386, 1985.

Smoking habits and drug use during early pregnancy declined dramatically compared with data from studies of similar populations in the mid-1960s and mid-1970s. Approximately 70 percent of 2,436 women in the Swedish study were interviewed regarding contraceptive technique used before pregnancy, smoking habits, drug use, exposure to x rays, and vaginal bleeding during the first 17 weeks of pregnancy. Relationship between the age of the woman and smoking habits indicated that the number of nonsmokers increased with increasing age and the number of light smokers decreased. Percentage of heavy smokers was independent of age. Vaginal bleeding during pregnancy was more common among heavy smokers. The effect of smoking on birth weight was also apparent. Among nonsmokers, 3.2 percent of infants weighed <2,500 compared with 10.8 percent among women who smoked more than 10 cigarettes/day. The proportion of infants who weighed >4,000 g was 17.8 percent for nonsmokers and 13.5 percent for heavy smokers. Infants of light smokers were of intermediate weight. Use of analgesics, which increased from 27 to 60.7 percent compared with earlier studies, was more common among smokers.

86–0520. Simmer, K.; Thompson, R.P.H. **Maternal Zinc and Intrauterine Growth Retardation.** *Clinical Science* 68(4):395-399, April 1985.

Although the mechanism of the association of smoking and intrauterine growth retardation (IUGR) is not known and smoking is not the only factor that causes zinc depletion and IUGR, there may be an interaction between cadmium inhaled in cigarette smoke and transfer of zinc to the fetus. Pregnant women who have low polymorphonuclear (PMN) cell zinc content and smoke are at risk of delivering small-for-gestational-age (SGA) infants, according to a study on maternal zinc and IUGR. PMN and mononuclear (MN) zinc content was significantly lower in smokers than in nonsmokers. Levels of zinc in plasma, erythrocytes, PMN, and MN white cells were measured after delivery in (group 1) women giving birth to appropriate-for-gestational-age (AGA) infants, (group 2) women with SGA infants, and nonpregnant controls. Mean maternal plasma zinc and albumin levels 24 to 48 hours after delivery were lower than in controls, but PMN and MN zinc levels were unchanged. PMN zinc levels were lower than in MN cells. PMN and MN zinc levels were significantly lower in mothers in group 2 than in group 1, irrespective of smoking habits. Fetal erythrocyte zinc levels were one-third of maternal levels. It is theorized that cadmium inhaled in cigarette smoke may stimulate synthesis of metallothionein, a low molecular weight protein that binds zinc and cadmium in intestine and placenta, thereby reducing intestinal absorption of zinc and its placental transfer. It is also suggested that mothers of SGA infants may eat less zinc than mothers of AGA infants. (Auth. Abs. Mod.)

86–0521. Spindle, A.; Wu, K. **Developmental and Cytogenetic Effects of Caffeine on Mouse Blastocysts, Alone or in Combination With Benzo(*a*)pyrene.** *Teratology* 32(2):213-218, October 1985.

Treatment of mouse blastocysts with both caffeine and benzo(*a*)pyrene (BaP) markedly enhanced incidence of sister chromatid exchanges (SCE). The number observed was more than twice as high as the sum of SCEs induced by either chemical alone. In all assays, only 1.0 μmol of BaP was used, a concentration that was not embryotoxic and did not induce SCEs. Caffeine interfered with blastocyst development in a dose-related manner. At 4 mmol, the highest concentration tested, caffeine interfered with development of blastocysts to all four endpoints: hatching, trophoblast outgrowth, inner cell mass (ICM) growth, and two-layer (primary endoderm and ectoderm) differentiation of ICMs. At 2 mmol, caffeine reduced incidence of both ICM growth and differentiation but did not affect hatching or formation of trophoblast outgrowths. At 1 mmol, caffeine interfered with only ICM differentiation. Cell proliferation was least sensitive to caffeine and was reduced at concentrations of ≥2 mmol. Induction of SCEs was most sensitive to caffeine exposure; an increase in SCE frequency was observed at 0.1 and 0.5 mmol. When caffeine was added to cultures with BaP, both embryotoxic effects and SCE frequency were increased. The enhancing effect on SCE induction was particularly marked; as little as 0.1 mmol caffeine was sufficient to cause doubling of induced SCE frequencies when added to cultures with BaP. (Auth. Abs. Mod.)

See also **86–0618**

OTHER DISEASES AND CONDITIONS

86–0522. Adelhoy, B.; Petring, O.U.; Jensen, B.N. et al. **Refraining From Cigarette Smoking Before Premedication Does Not Decrease the Risk of Acid Pulmonary Aspiration During Anaesthesia.** *Canadian Anaesthetists' Society Journal* 32(5):499-501, September 1985.

Habitual smokers undergoing elective orthopedic surgery and refraining overnight from cigarette smoking were randomly allocated into two groups to investigate effects of smoking on volume and pH of gastric contents. The 74 smokers (mean age 37 years) consumed an average of 15 cigarettes/day and had smoked an average of 17 years. Half of the group was allowed to smoke two cigarettes prior to premedication; the other half was not allowed to smoke. No significant difference in volume or pH between the two groups was observed following intubation nor prior to extubation, indicating no decreased risk of acid pulmonary aspiration from cigarette smoking abstinence. (Auth. Abs. Mod.)

86–0523. Balkau, B.; King, H.; Zimmet, P., et al. **Factors Associated With the Development of Diabetes in the Micronesian Population of Nauru.** *American Journal of Epidemiology* 122(4):594-605, October 1985.

A longitudinal study of 266 adult residents of the Pacific island of Nauru was undertaken to determine the relationship between physiologic and anthropologic factors and development of glucose intolerance. Factors, including smoking history, were surveyed between May 1975 and January 1976 and all subjects were classified as nondiabetic. In January 1982, subjects were reexamined and 27 were classified as diabetics (annual incidence 1.6 percent). In univariate analysis, smoking was a significant predictor of diabetes in males ($p=0.008$) but not in females ($p=0.8$). Overall, 58 percent of nondiabetic and 77 percent of diabetic males reported smoking at some time in their lives, whereas 65 and 64 percent, respectively, of females were current or former smokers. The 2-hour, post-load plasma glucose concentration was found to be the factor most consistently associated with subsequent glucose intolerance. Other predictors included fasting plasma triglyceride concentration, blood pressure, and body mass index in men, and 2-hour plasma insulin concentration, plasma uric acid concentration, body mass index, and fasting plasma glucose concentration in women.

86–0524. Bergoz, R. **Cimetidine et Bismuthate Dicitratotripotassique (Duosol) Dans L'Ulcere Duodenal Chronique. [Cimetidine and Tripotassium Dicitrato Bismuthate (Duosol) in Chronic Duodenal Ulcer].** *Schweizerische Medizinische Wochenschrift* 115(29):1024-1025, 1985, French.

Nonsmokers being treated for chronic duodenal ulcer had an advantage over smokers during the first 6 months of a 1-year treatment program, according to analysis of smoking habits and treatment and relapse rates among patients. In an open study, 32 men and 8 women (mean 42.6 years of age) with chronic duodenal ulcer of several years' standing (mean 10.7 years) were treated with either tripotassium dicitrato bismuthate (TDB, also known as De-Nol) or cimetidine. Duration of treatment was 30 days for TDB and 43 (±10 days) for cimetidine. Ten patients on TDB and 12 patients on cimetidine smoked five cigarettes/day. The relapse rate was lower among nonsmokers ($p<0.05$) during the first 6 months, but no difference in relapse rate was observed during the subsequent 6 months. (Auth. Abs. Mod.)

86–0525. Duner-Engstrom, M.; Fredholm, B.B.; Larsson, O., et al. **Autonomic Mechanisms Underlying Capsaicin Induced Oral Sensations and Salivation in Man.** *Acta Physiologica Scandinavica* 124(Supplement 542):250, 1985.

Nicotine applied to the lingual apex of the tongue produced a sweet taste and a slight increase in salivation, but not in amylase secretion. Capsaicin, nicotine, and citric acid were applied to the apex or radix of the tongue, and taste sensations and salivation were evaluated with respect to the presence of the peptide substance P (SP) or SP immunoreactive (IR) neurons. Capsaicin applied to the apex (but not the radix) caused a burning sensation, salivation, and amylase secretion. Salivation response was not significantly reduced by methylscopamine pretreatment. Citric acid application to both the apex and radix caused salivation and amylase secretion that was not reduced by methylscopalamine pretreatment. Application to the apex produced a burning sensation and radix application gave a distinct sour taste. The pattern of taste sensations and salivary secretion following application of the different compounds differed between agents used and between different sites of application, and paralleled the presence of intraepithelial SP-IR neurons.

86–0526. Eriksson, H.; Svardsudd, K.; Larsson, B., et al. **Body Temperature in General Population Samples. The Study of Men Born in 1913 and 1923.** *Acta Medica Scandinavica* 217(4):347-352, 1985.

Smoking prior to measurement did not appear to effect body temperature in 816 men, 57 and 67 years old, sampled from the general population of Goteborg, Sweden, and in 22 physically highly active men sampled on clinical grounds. Measurements were taken in the morning for 14 months. Mean body temperature was 36.8±0.4° C (after adding 0.3° C to readings to make them comparable with rectal readings). Seasonal variations were observed: a peak during the winter and a trough during the summer. Body temperature was inversely correlated with height and positively correlated with weight and body fat, but not with lean body mass. High levels of physical activity and sensitivity to heat were associated with a higher than average body temperature, while sensitivity to cold was associated with lower than average body temperature. Age, smoking, and medication with acetylacetic acid or thyroxin did not appear to be related to body temperature. (Auth. Abs. Mod.)

86–0527. Farley, A.; Levesque, D.; Pare, P., et al. **A Comparative Trial of Ranitidine 300 mg at Night With Ranitidine 150 mg Twice Daily in the Treatment of Duodenal and Gastric Ulcer.** *American Journal of Gastroenterology* 80(9):665-668, September 1985.

Smoking adversely affected the healing rate of duodenal ulcers (DU), but had no significant effect on gastric ulcer (GU) healing in a comparative trial of oral ranitidine. Patients were randomly allocated to receive 300 mg ranitidine, either by a placebo tablet in the morning and 300 mg tablet at bedtime, or two 150 mg tablets (in the morning and at bedtime). The multicenter double-blind comparative trial was conducted with 89 DU and 54 GU patients over a 4-week period. No statistically significant differences in the ulcer healing rate were associated with the once daily (DU 86.4 percent, GU 62.5 percent) and twice daily (DU 84.4 percent, GU 73.3 percent) regimens. DU ulcers in all nonsmoking patients healed in 4 weeks, a rate significantly different from the 80.9 percent rate observed in the 68 smokers. Further improvement in cumulative healing rates in response to both treatment regimens was observed following a second 4-week treatment for those patients whose ulcers had failed to heal during the first month. (Auth. Abs. Mod.)

86–0528. Gammage, R.B.; Kaye, S.V.; Jacobs, V.A. (Editors). **Indoor Air and Human Health.** Chelsea, Michigan, Lewis Publishers, Inc., 1985, 430 pp.

Environmental cigarette smoke was one of several categories of indoor pollutants having health effects in humans and animals that were discussed at the Seventh Oak Ridge National Laboratory Life Sciences symposium. The discussion on passive cigarette smoke is divided into (1) sidestream and mainstream tobacco smoke constituents and exposure-quantifying markers; (2) measurement of sidestream cigarette smoke exposure; (3) biological potential and exposure-dose relationship for cigarette smoke exposure; (4) relationship between passive cigarette smoke and cancer; and (5) relationship between passive exposure to cigarette smoke and cardiopulmonary disease. An overview of current research and questions still to be answered regarding passive smoking is included. Other indoor pollutants discussed are radon, microorganisms, combustion products, and organics.

86–0529. Glober, G.A.; Rhoads, G.G.; Liu, F., et al. **The Effect of Partial Gastrectomy on Lipoproteins and Other Characteristics.** *Journal of Chronic Diseases* 38(7):609-615, 1985.

Arteriosclerosis risk factors (including smoking, alcohol and coffee consumption, blood pressure, and serum cholesterol) were examined in 6,860 50- to 77-year-old Japanese men in Honolulu, of whom 291 were known to have had a gastrectomy for benign gastric (189) or duodenal (102) ulcer; 132 with documented peptic ulcer disease had been treated medically. Present smoking and number of cigarettes smoked/day were found to be significantly associated with gastrectomy ($p<0.01$) but not with medically treated ulcer disease. In the gastrectomy group, 52.8 percent were current smokers compared with 33.3 percent in the medically treated group and 33.5 percent of 1,433 controls. Average daily cigarette consumption was 12.2, 7.2, and 7.6, respectively. Multiple regression analysis revealed that daily cigarette consumption significantly discriminated surgically treated patients from controls ($p<0.001$) and medically treated patients ($p<0.05$). Surgically treated patients also had higher levels of coffee and beer consumption and lower weight, blood pressure, and serum cholesterol levels.

86–0530. Gracey, D.L.; McElnay, J.C. **Disturbances in Digestion.** *Pharmaceutical Journal* 235(6349):439-440, October 1985.

Gastrointestinal disturbances related to smoking, alcohol consumption, and foodstuffs (and related antacid use) were surveyed in 201 members of Northern Ireland's general population (90 females and 111 males, age range 18 to 70). Overall, 24 percent of females and 41 percent of males were frequent sufferers of indigestion; 90 percent of males and 82 percent of females used antacids for relief daily or two to three times/week; and 79 percent of females and 81 percent of males were nonsmokers. Of the 15 male ex-smokers, 10 felt that giving up smoking helped reduce incidence of digestive problems; 5 of 11 male heavy smokers (>20 cigarettes/day) experienced fewer symptoms with reduction in smoking. None of the four female ex-smokers had experienced any change, and only 2 of 19 female smokers felt reducing smoking led to any improvement. A reduction in alcohol consumption and smoking, particularly in males, decreased digestive disturbances. These findings agree with known pharmacology of alcohol and nicotine; i.e., increased hydrogen ion secretion in the stomach. Pharmacists should advise against consumption of alcohol and nicotine, particularly by frequent sufferers of indigestion.

86–0531. Jensen, J.; Christiansen, C.; Rodbro, P. **Cigarette Smoking, Serum Estrogens, and Bone Loss During Hormone-Replacement Therapy Early After Menopause.** *New England Journal of Medicine* 313(16):973-975, October 1985.

Smoking increased hepatic metabolism of estrogens in 136 postmenopausal hormone-treated women, resulting in lower estrogen levels that could contribute to risk of osteoporosis in smokers. The women were treated for 1 year with one of three different doses of combined estrogen-progestogen or placebo and grouped according to smoking status. Serum levels of estrone and estradiol were measured before and after treatment. Results showed reduced levels of both estrogens in smokers compared with nonsmokers in all dosage groups. The reduction was most pronounced in the high-dose group (4 mg estradiol), in which serum levels of estrone and estradiol in smokers were only 50 percent of those in nonsmokers ($p<0.001$ and <0.05, respectively). In contrast, no significant changes were found in the placebo groups. Moreover, significant inverse correlations were observed between daily cigarette consumption and change in levels of serum estrone and estradiol ($p<0.001$). The effect of smoking on bone mineral content was evaluated in 28 smokers and 28 nonsmokers receiving high-dose hormones. The mean change in bone mineral content (percentage/year) in smokers was significantly lower than the value in nonsmokers (1.01 ± 0.43 percent vs. 2.58 ± 0.86 percent, $p<0.05$). (Auth. Abs. Mod.)

86–0532. Klein, R.; Klein, B.E.K.; Moss, S.E. **A Population-Based Study of Diabetic Retinopathy in Insulin-Using Patients Diagnosed Before 30 Years of Age.** *Diabetes Care* 8(Supplement 1):71-76, September-October 1985.

Smoking did not appear to be related to prevalence or severity of retinopathy among 996 insulin-taking patients diagnosed as diabetic before 30 years of age. Fundus photographs revealed that 72 percent of diabetic women and 69 percent of diabetic men had retinopathy. More men (12 percent) than women (7 percent) had severe proliferative retinopathy. Patients were classified as nonsmokers, ex-smokers, and smokers. Longer duration of diabetes, higher glycosylated hemoglobin, older age at examination, higher diastolic blood pressure, male gender, and presence of proteinuria contributed significantly to describing increasing severity of retinopathy. No relationship was found with insulin type, number of daily insulin doses, or amount of daily insulin. Failure to find a relationship between cigarette smoking and severity of retinopathy may be because cigarette smokers with severe retinopathy are at higher risk of death than nonsmokers with minimal retinopathy. Data are needed on development and progression of retinopathy to explore potential causes. (Auth. Abs. Mod.)

86–0533. Krumsiek, J.; Kruger, C.; Patzold, U. **Tobacco-Alcohol Amblyopia Neuro-Ophthalmological Findings and Clinical Course.** *Acta Neurologica Scandinavica* 72(2):180-187, August 1985.

Alcohol abuse is the major risk factor in tobacco-alcohol amblyopia (TAA) while smoking appears to play a minor role, according to a study of 40 patients. TAA is characterized by distinct bilateral visual disturbances, symmetric scotomas, acquired disturbances of color vision, and mostly normal fundi. Visual acuity is usually grossly diminished. The course of the disease was studied in 15 patients longitudinally over a period of 31 months. In addition, acute development was monitored during a 4-week period of inpatient treatment. Patients consumed >80 g alcohol/day and were heavy smokers (>20 cigarettes/day). Central scotomas were present in 80 percent. Acquired disturbances of color vision usually concerned the red-green sense (84 percent). Amplitudes of the visual-evoked potentials were always reduced and deformed. Prognosis of the visual disturbances was unpredictable. Abnormalities improved in one-half of the patients, but complete recovery was never reached. The fact that visual disturbance improved in several cases despite continuous smoking casts doubt on the assumption that smoking plays a role in the pathogenesis of amblyopia. It is suggested that immediate discontinuation of alcohol intake is the best therapy for TAA. (Auth. Abs. Mod.)

86–0534. Markkanen, H.; Paunio, I.; Tuominen, R., et al. **Smoking and Periodontal Disease in the Finnish Population Aged 30 Years and Over.** *Journal of Dental Research* 64(6):932-935, June 1985.

Among the Finnish adults surveyed, there were only small differences in periodontal condition between smokers and nonsmokers. The risk ratio in smokers for having one or more periodontal pockets was 1.39 for men and slightly lower for women. Among smokers, 26.3 percent did not brush their teeth regularly (compared with 14.7 percent of nonsmokers) and heavier smokers (>20 cigarettes/day) had more periodontal pockets than lighter smokers (<20 cigarettes/day). Smokers consistently had fewer teeth than nonsmokers. Ninety percent of the 8,000 subjects aged 30 years and over who participated in the Mini-Finland Oral Health survey also participated in clinical examination. Periodontal diagnoses were made according to modified Periodontal Treatment Need System. Information on age, toothbrushing, and smoking habits was collected by personal interviews. A log-linear model was used to study simultaneous associations and interactions between smoking, periodontal disease, and background factors. (Auth. Abs. Mod.)

86–0535. Marks, I.N.; Wright, J.P.; Girdwood, A.H., et al. **Maintenance Therapy With Sucralfate Reduces Rate of Gastric Ulcer Recurrence.** *American Journal of Medicine* 79(Supplement 2C):32-35, August 30, 1985.

In a double-blind placebo-controlled trial of sucralfate for gastric ulcer relapse prevention, 50 of 61 patients were smokers (about half consumed >10 cigarettes/day). The 31 patients on sucralfate were given 1.0 g in the morning and 2.0 g at night. All patients were assessed endoscopically at entry and at 24 weeks or at relapse. Recurrence among smokers was significantly lower in the sucralfate-treated group than in the placebo-treated group: 5 of 27 smokers and no nonsmokers given sucralfate relapsed, while 18 of 23 smokers and 3 of 7 nonsmokers given placebo relapsed. Most recurrences occurred during the first 12 weeks, with relapse rates of 10 percent and 53 percent, respectively, for the sucralfate- and placebo-treated groups. Three recurrences noted at 24 weeks were asymptomatic; two of these were in the sucralfate-treated group. Results indicate that a 3 g/day maintenance dose of sucralfate offers meaningful protection against recurrence of gastric ulceration. (Auth. Abs. Mod.)

86–0536. McIntosh, J.H.; Byth, K.; Piper, D.W. **Environmental Factors in Aetiology of Chronic Gastric Ulcer: A Case Control Study of Exposure Variables Before the First Symptoms.** *Gut* 26(8):789-798, August 1985.

It is possible that up to 80 percent of gastric ulcer disease can be attributed to smoking and the daily ingestion of analgesic and anti-inflammatory drugs, based on an examination of environmental factors in the etiology of chronic gastric ulcer. Smoking, alcohol consumption, and ingestion of aspirin and/or paracetamol and nonsalicylate nonsteroidal anti-inflammatory drugs (NSNSAID) were investigated in 104 patients during three periods; the lifetime, 5 years, and 1 year before initial onset of ulcer symptoms. In all periods, a statistically significant risk of gastric ulcer was associated with smoking and daily use of aspirin, indomethacin, and other nonsalicylate nonsteroidal anti-inflammatory drugs as a group, but not with alcohol or daily use of paracetamol. Smokers were defined as smoking more than one cigarette/day for 6 consecutive months. Results indicate that 40 percent of gastric ulcer disease is attributable to smoking, 32 percent to daily analgesic drugs, and 25 percent to daily NSNSAID. As a group, the factors accounted for 52 percent of gastric ulcer disease in men and 90 percent in women (79 percent for the sexes combined). (Auth. Abs. Mod.)

86–0537. McKinlay, S.M.; Bifano, N.L.; McKinlay, J.B. **Smoking and Age at Menopause in Women.** *Annals of Internal Medicine* 103(3):350-356, September 1985.

Current female smokers reach menopause an average of 1.74 ± 0.46 years earlier than nonsmokers ($p<0.01$), but the quantity smoked appears to have a negligible effect. Of several variables considered, only smoking showed a major effect on age at last menstruation. A population-based random sample of 7,828 white women, aged 45 to 55 years (77 percent response) found that the median age at last menstruation was 51.4 ± 0.19 years. Smoking status, determined by precoded responses, showed that of the 2,103 smokers, 709 smoked <1 pack/day; 1,090, 1 to 2 packs/day; and 293, >2 packs/day. Other variables considered (marital status, number of children, location of residence, and education) had little effect on age at menopause. Also, no secular trends toward a later age at menopause over the last 25 years was observed. (Auth. Abs. Mod.)

86–0538. O'Doherty, C.J.; MacIntyre, C. **Palmoplantar Pustulosis and Smoking.** *British Medical Journal* 291:861-864, September 1985.

Palmoplantar pustulosis was more prevalent in smokers in a United Kingdom pilot study. Women smokers seem particularly susceptible to the chronic skin disease. A multicenter case—control study of 216 patients and 628 controls with miscellaneous dermatoses showed a considerably higher prevalence of smoking in the group with palmoplantar pustulosis. Relative risk of smokers contracting the disease was estimated to be 7.2 ($p<0.00001$). Controlling for social class as a confounding factor resulted in a smoking-related risk of 9.0. How smoking affects the pathogenesis of the disease remains unclear. It is proposed that pathogenesis of other more common inflammatory dermatoses (such as chronic hand dermatitis and psoriasis), thought by many to be closely related to palmoplantar pustulosis, may also be affected by smoking.

86–0539. Olson, B.L.; McDonald, J.L., Jr.; Gleason, M.J., et al. **Comparisons of Various Salivary Parameters in Smokers Before and After the Use of a Nicotine-Containing Chewing Gum.** *Journal of Dental Research* 64(5):826-830, May 1985.

Significant differences were found between smokers and nonsmokers in an investigation of the effects of smoking and nicotine chewing gum on oral health. At baseline examination, 43 nonsmokers and 193 smokers were assigned to (1) nonsmokers who did not use any gum, (2) smokers who used nicotine gum, and (3) smokers who used placebo gum. Saliva was collected and analyzed for acidogenicity and buffer pH and for levels of thiocyanate, lactoperoxidase, lysozyme, lactoferrin, and secretory immunoglobulin A. After 15 weeks, saliva was again collected and analyses repeated. It was found that saliva of smokers contained higher concentrations of thiocyanate and lower concentrations of lactoferrin at baseline examination and after the 15-week test period than saliva of nonsmokers. In addition, carbon monoxide content of alveolar air was higher in smokers. In contrast, use of nicotine gum had no effect on any test parameters. The observation that smokers have reduced levels of lactoferrin in saliva was unexpected and suggests that there may be at least subtle differences between smokers and nonsmokers in overall resistance to some of the factors contributing to dental caries. (Auth. Abs. Mod.)

86–0540. O'Rourke, I.C. **Elective Surgery for Peptic Ulcer: A Five-Year Review.** *Medical Journal of Australia* 143(1):13-16, July 1985.

Smoking, alcohol, and nonsteroidal anti-inflammatory drug (NSAID) intake adversely affected ulcer healing among patients who underwent elective surgery, but the difference was not statistically significant ($p=0.474$). A prospective study of surgery for peptic ulcer was undertaken to assess the results of surgery in the post-cimetidine era. Over a 5-year period, 125 patients had undergone surgery (82 parietal cell vagotomies, 10 vagotomy and drainage procedures, 10 Billroth I gastrectomies, 7 Billroth II gastrectomies, and 15 vagotomy and antrectomy procedures). There were no postoperative deaths. The highest number of smokers was among patients with combined duodenal and gastric ulcers (56 percent) and patients with duodenal ulcers (47.8 percent). Overall, outcome was satisfactory in 92 patients, less than satisfactory in 13, and was considered a failure in 14 either because of recurrent ulceration (8 percent) or because of postoperative sequelae. Recurrence rate after parietal cell vagotomy was 5 percent, with less satisfactory results in women. No significant difference in recurrence rate could be demonstrated between patients whose ulcers healed quickly after medical therapy and those whose ulcers did not heal. (Auth. Abs. Mod.)

86–0541. Porro, G.B.; Panza, E. **Smoking, Sugar, and Inflammatory Bowel Disease. (Letter).** *British Medical Journal* 291(6500):971-972, October 1985.

Smoking habits in combination with ingestion of refined carbohydrates and vegetable fiber were studied in 124 patients suffering from ulcerative colitis and 109 with Crohn's disease, and in 250 sex- and age-matched controls. Ulcerative colitis was more common among ex-smokers or patients who had stopped smoking at least 1 year before disease onset (relative risk (RR) 0.3; $p<0.05$). A seemingly protective effect of smoking was also brought to light by analyzing incidence of ulcerative colitis among people who smoked >15 cigarettes/day (RR 0.3; $p<0.003$). Conversely, a positive correlation was found between smoking and Crohn's disease. The risk was 3.7 times greater among smokers than among nonsmokers ($p<0.05$). Both diseases were positively correlated with refined carbohydrate intake. High intake of sugar increased the risk of contracting ulcerative colitis or Crohn's disease by a factor of 2.37 and 2.38 compared with normal consumption. A large intake of bread increased the risk, up to 6.38 and 3.76 times, respectively. In contrast, a substantial intake of vegetables and fruit seemed to reduce the risk (RR for Crohn's disease 0.36 and 0.66; RR for ulcerative colitis 0.30 and 0.38). (Auth. Abs. Mod.)

86–0542. Preston, P.G. **General Practitioners' Advice on Smoking to Patients Referred for Barium Meals. (Letter).** *British Medical Journal* 291(6497):737, September 1985.

Despite evidence that cigarette smoking lowers the tone of the lower esophageal sphincter and slows healing of duodenal ulcers, only 29 out of 57 smokers had been advised by a general practicioner to stop smoking prior to barium meals. Before treatment, the 132 patients were asked about current medical treatment, about smoking habits, and whether their general practitioner had advised them about smoking. Among smokers, 10 had duodenal ulcers, 9 had scarred duodenums, 2 had gastric ulcers, 5 esophageal reflux, 3 hiatal hernias, 1 reflux esophagitis, and 1 duodenal erosions. More smokers (42 percent) than nonsmokers (29 percent) had been prescribed H_2 receptor antagonists, but slightly fewer smokers had been prescribed antacids (42 vs. 52 percent). Smoking is a possible cause of duodenal ulceration in some patients, and should be avoided by patients with reflux. It also has an adverse effect on healing, and smokers have higher relapse rates than nonsmokers. In this study, 25 of the 29 abnormal barium meals in smokers showed conditions where cessation of smoking may have been a necessary part of treatment.

86–0543. Preventive Medicine. **Proceedings of the International Symposium on Medical Perspectives on Passive Smoking.** *Preventive Medicine* 13(6):557-746, November 1984.

The November 1984 issue of *Preventive Medicine* is devoted entirely to a symposium on passive smoking, hosted by the German Society of Occupational Medicine, in Vienna. Topics covered by the 16 papers include (1) constituents of sidestream smoke; (2) dynamics of smoke constituents in human lungs; (3) annoyance and irritation related to passive smoking; (4) influence on the cardiovascular and respiratory system; (5) cancer-related risk; and (6) measurement of passive smoke exposure. Data on the extent of passive smoking in the Federal Republic of Germany is included, as is a roundtable discussion of the scientific aspects of the passive smoking—health controversy. See also 85-1589, 85-1591, 85-1593, 85-1613, 85-1668, 85-1675, 85-1702, 85-1716, 85-1720, 85-1735, 85-1769, 85-1801, 85-1804, 85-1814, 85-1910.

86–0544. Richardson, C.T. **Pathogenetic Factors in Peptic Ulcer Disease.** *American Journal of Medicine* 79(Supplement 2C):1-7, August 30, 1985.

Environmental factors such as smoking, anti-inflammatory drug use, and emotional stress may play a role in the pathogenesis of ulcer disease. Epidemiologic evidence, which suggests an association between smoking and ulceration, shows that (1) ulcer patients are smokers more frequently than controls; (2) there is a correlation between smoking rates and prevalence of ulcer disease; and (3) ulcer healing rates are slower in smokers. Also, death rates are higher in smokers than in nonsmokers. The roles of alcohol and caffeine consumption and stress in peptic ulcer disease are also considered. Mechanisms of pathogenesis are reviewed in detail, including acid secretion, pepsin secretion, mucosal defense, alterations in mucosal defense leading to ulcerative disease, and genetics.

86–0545. Shield, M.J. **Interim Results of a Multicenter International Comparison of Misoprostol and Cimetidine in the Treatment of Out-Patients With Benign Gastric Ulcers.** *Digestive Diseases and Sciences* 30(11):178S-184S, November 1985.

Cure rates in treatment of outpatients with benign gastric ulcers were 20 percent higher for nonsmokers than smokers on misoprostol, while a similar effect in patients on cimetidine was not apparent. The effects of misoprostol 50 μg (low dose), misoprostol 200 μg (high dose), and cimetidine 300 mg in patients with endoscopically diagnosed benign gastric ulcers were analytically compared internationally. Of the target 600 patients, 421 had been recruited by 22 principal investigators in 13 countries. The 22 percent greater healing rate for nonsmokers in the low-dose misoprostol group and the 71 percent healing rate for nonsmokers in the high-dose misoprostol group (highest for any subgroup) suggests that the effect of misoprostol on gastric ulcer healing (even at the minimally antisecretory low dose) can be enhanced given the right conditions. Cure rates at 4 weeks for all eligible patients receiving at least one dose of medication were significantly lower ($p=0.002$) for low-dose misoprostol (41.2 percent) than for high-dose misoprostol (58.2 percent). There was no significant difference ($p=0.86$) in cure rates between high dose misoprostol and cimetidine (59.6 percent). (Auth. Abs. Mod.)

86–0546. Stermer, E.; Levy, N.; Heinrich, I., et al. **Smoking, Sugar, and Inflammatory Bowel Disease. (Letter).** *British Medical Journal* 291(6493):487, August 17, 1985.

A recent report (*British Medical Journal* 290(6484):1786-1787, June 15, 1985) reemphasized the relationship between smoking, sugar, and inflammatory bowel disease; however, the conclusion that smoking may confer some protection against ulcerative colitis requires additional evidence. Among a group of 93 outpatients with ulcerative colitis, 71 (76 percent) have never smoked compared with 112 of 177 (63 percent) age- and sex-matched controls ($p<0.05$). Furthermore, 9 patients (9.6 percent) with ulcerative colitis and 39 controls (22 percent) smoked between one-half and two packs of cigarettes/day ($p<0.05$). Data that show lower morbidity in ex-smokers compared with never smokers raise further questions regarding the protective effects of smoking. Smoking does not appear to affect the extension of ulcerative colitis; 11 of 14 patients (78 percent) with total colitis were nonsmokers compared with 60 of 79 (76 percent) of patients with proctitis or left-sided colitis. Conversely, smoking was more common in a group of 10 patients with Crohn's disease than among controls. See also 86-0201.

86–0547. Van Deventer, G.M.; Schneidman, D.; Walsh, J.H. **Sucralfate and Cimetidine as Single Agents and in Combination for Treatment of Active Duodenal Ulcers. A Double-Blind, Placebo-Controlled Trial.** *American Journal of Medicine* 79(Supplement 2C):39-44, August 30, 1985.

Smoking significantly reduced the frequency of healing at 4 weeks during a randomized, double-blind, double-placebo trial of duodenal ulcer patients. Rates and predictors of ulcer healing were studied during treatment with sucralfate, cimetidine, or a combination of the two drugs. Standard therapeutic dosage regimens were used in each group. No antacids were allowed. Eight patients were dropped for protocol violations or unrelated medical illnesses; data from 61 patients were suitable for analysis. The healing rates achieved with sucralfate and cimetidine did not differ significantly at any time. However, the healing rate at 2 weeks for combination therapy (33 percent) was higher than for either sucralfate alone (15 percent) or cimetidine alone (10 percent). Cigarette smoking, a prior history of ulcer disease, and a low pepsinogen I to pepsinogen II ratio were significant predictors of delayed healing. (Auth. Abs. Mod.)

86–0548. Vogt, H.-J.; Borelli, S.; Heller, W.-D. **Fertilitat bei Rauchern und Nichtrauchern. [Fertility of Smokers and Nonsmokers.]** *Zeitschrift fur Hautkrankheiten* 60(14):1127-1146, July 1985, German.

Cigarette smoking appeared to have no detrimental effect on spermatogenesis in healthy men (aged 20 and 40), based on a blind study of 333 volunteers. Results contradict earlier findings from retrospective studies. Data on 95 smokers and 83 nonsmokers remained to be evaluated after application of the following criteria: comparatively high consumption of alcohol, drugs, and medicine; radioactive exposure; and presence of genital diseases. Significant differences were only behaviorial: smokers had higher rates of divorce, drank more alcohol and consumed more drugs, and had experienced first sexual intercourse at an earlier age than nonsmokers. However, all spermatological parameters and the outcome of cytophotometric examination of spermatozoa DNA showed a close correlation between smokers and nonsmokers. Although individual reactions to tobacco smoking cannot be ruled out, findings suggest that cigarette smoking has no detrimental influence on the spermatogenesis of healthy young men. (Auth. Abs. Mod.)

86–0549. Wall, M.; Brooks, J.; Holsclaw, D., et al. **Health Effects of Smoking on Children.** *American Review of Respiratory Disease* 132(5):1137-1138, November 1985.

Cigarette smoke has adverse effects on health from conception through adolescence, and evidence indicates that most adults who smoke began during childhood. Guidelines and recommendations drafted by the Scientific Assembly on Pediatrics of the American Thoracic Society (focusing on lung health of children) include (1) incorporation of information on effects of smoking into general health curriculums beginning in the early grades; (2) funding of research exploring innovative methods of smoking prevention; (3) encouraging smoking bans in public areas, especially hospitals, public transport, schools, and other areas frequented by children; (4) recommending to parents that they stop exposing children to cigarette smoke and including passive exposure in medical histories of children; (5) encouraging health professionals to neither smoke nor allow smoking in offices; (6) initiating a nationwide campaign aimed at young parents on effects of passive smoking on the fetus and the young child; (7) expanding efforts to prevent adolescents from smoking; and (8) encouraging more research into passive smoking effects on respiratory infections and lung function in childhood, concentrating on the interaction of passive smoking with respiratory tract infections, atopic phenomena, and bronchial reactivity. (Auth. Abs. Mod.)

86–0550. Zosimov, A.N.; Starozhinskaya, T.A. **Rol' "Passivnovo Kureniya" v Patogeneze Retsidiviruyushchevo i Astmaticheskovo Bronkhitov u Detey. [The Role of "Passive Smoking" in the Pathogenesis of Recurrent and Asthmatic Bronchitides in Children.]** *Voprosy Okhrany Materinstva i Detstva* 30(6):75-76, June 1985, Russian.

The role of passive smoking in the pathogenesis of recurrent and asthmatic bronchitis was studied in 286 children aged 2 to

9 years. Exposure in 160 children with recurrent bronchitis often aggravated the bronchial condition. Children coughed more frequently, experienced bronchospasms, and had lower indices of tachometric and pulse-to-breath rates and higher skin temperature dissymmetry. Passive smoking effects on 126 children with asthmatic bronchitis were even more significant. Children became ill sooner and symptoms were aggravated. Patients coughed more frequently, experienced bronchospasms, pneumonia and angina in anamnesis, pharyngeal staphylococci, and increased perspiration. In addition, lower pneumotachometric and pulse-to-breath rates and higher exhale-to-inhale rates were observed. Results verify that the effects of passive smoking on recurrent and asthmatic bronchitis are pathogenetically similar. Passive smoking significantly affects children, particularly the respiratory system, and is one of the contributing causes in development of bronchitis. Over time, asthmatic bronchitis is aggravated by exposure to passive smoke. (Auth. Abs. Mod.)

BEHAVIORAL AND PSYCHOLOGICAL ASPECTS

86–0551. Ames, R.G.; Hall, D.S. **Smoking Cessation Among Coal Miners as Predicted by Baseline Respiratory Function and Symptoms: A 5-Year Prospective Study.** *Preventive Medicine* 14(2):181-186, March 1985.

Prospective analysis of 1,118 white, male, underground coal miners was undertaken to determine whether respiratory impairment or presence of respiratory symptoms provides inducement and, therefore, predicts 5-year cigarette smoking cessation. Data were derived from a National Institute for Occupational Safety and Health study that examined miners in Kentucky, Colorado, and Utah in 1977 and again in 1982. Airways obstruction was determined and bronchitis symptoms were measured. Of 467 miners who were smokers in 1977, 122 (26.1 percent) reported having stopped by 1982. Eastern miners with bronchitis symptoms in 1977 were less likely to have stopped smoking by 1982 ($p<0.05$). Miners with airways obstruction were more likely to have stopped smoking; however, the relationship was not significant. Associations between smoking cessation and respiratory symptoms and obstruction in Western miners were similar to those of Eastern miners, but neither relationship achieved statistical significance.

86–0552. Biglan, A.; Lichtenstein, E. **A Behavior-Analytic Approach to Smoking Acquisition: Some Recent Findings.** *Journal of Applied Social Psychology* 14(3):207-223, 1984.

Smoking among adolescents, particularly the role of environmental factors in shaping and maintaining ongoing behavior and predisposition toward certain behavior, was studied from questionnaire and interview data. In-depth exploration of initial episodes revealed strong evidence of social influences, e.g., smoking never occurred alone and other experimenters were frequently present. Number of smoking friends (especially high school students) was significant in predicting smoking rate up to 1 year. Although parental smoking did not predict continued smoking among adolescents who had begun to smoke, young people whose parents "would be angry" if they smoked, were smoking less 6 months later. Smoking in the presence of parents indicated that many parents condoned smoking. Findings suggest that emphasis on peer influence processes and current prevention programs is appropriate. Changing peer influences may prevent both initial experimentation and continued smoking and may be influential in encouraging starters to quit. The apparently gradual development of adolescent smoking and the large proportion of young people who experiment but do not become regular smokers suggest the need for caution in interpreting prevention studies that deter the onset of experimental smoking. Success in deterring experimentation may not imply that the program is effective in preventing endpoint smoking. (Auth. Abs. Mod.)

86–0553. Chamberlain, A.T.; Higenbottam, T.W. **Nicotine and Cigarette Smoking: An Alternative Hypothesis.** *Medical Hypotheses* 17(4):285-297, August 1985.

The hypothesis discussed suggests that smokers may attempt to balance the amount of tar and nicotine in smoke drawn from a cigarette to facilitate subsequent inhalation. It is the nicotine concentration in smoke particles, rather than the overall nicotine yield of the cigarette, that is the principal determinant of the amount of smoke inhaled from a cigarette. It is hypothesized that smokers, while smoking a single cigarette, will alter puffing patterns in response to the increase in tar to nicotine ratio (and hence decline in nicotine concentration) that is known to occur as a cigarette is progressively consumed. It is suggested that nicotine, in addition to its central nervous system effects, may also reduce local acute airway responses to irritants in cigarette smoke (which would explain some anomalous results of smoking behavior research). Implications for cigarette design and for recommendations made to smokers, i.e., to smoke low-tar cigarettes with enhanced nicotine yields, are discussed. Smoke from such cigarettes may be easier to inhale, but the smoker may increase his exposure to other toxic ingredients in tobacco smoke. It is recommended that factors determining all aspects of smoking behavior be better understood before encouraging further changes in cigarette smoke composition. (Auth. Abs. Mod.)

86–0554. Chassin, L.; Presson, C.C.; Sherman, S.J., et al. **Predicting the Onset of Cigarette Smoking in Adolescents: A Longitudinal Study.** *Journal of Applied Social Psychology* 14(3):224-243, 1984.

Smoking prevention programs aimed at specific high-risk adolescents may be more effective than those directed at general adolescent populations. In a longitudinal study, second-year smoking status of adolescents who were initially nonsmokers or experimenters was predicted from first-year standing on three types of social psychological variables: Ajzen and Fishbein's factors (predicting smoking transitions from attitudes, normative beliefs, and behavioral intentions about smoking); Jessor and Jessor's distal variables (predicting smoking transitions from more generalized personality and perceived environment factors); and smoking environment variables (predicting smoking transitions from extent of smoking models in an adolescent's social milieu). Predictive power of the three categories was compared. All were statistically significant predictors of smoking transition. Ajzen and Fishbein variables were more important for experimenters; Jessor and Jessor and smoking environment variables were more important for initial never smokers. Implications for design of effective smoking prevention programs are discussed. (Auth. Abs. Mod.)

86–0555. Clayton, R.R.; Ritter, C. **The Epidemiology of Alcohol and Drug Abuse Among Adolescents.** *Advances in Alcoholism and Substance Abuse* 4(3/4):69-97, Spring-Summer, 1985.

A review of trends in drug use by adolescents shows that the proportion who have used "only marijuana" has gone down as the percentage of youth who have used marijuana, cigarettes, alcohol, and other illicit drugs has increased. Data examined from ongoing nationwide studies regarding lifetime, past year, and past month use of various drugs indicate that lifetime prevalence figures for cigarette use declined slightly from 76 percent in 1977 to 70 percent in 1982. Data on use of cigarettes in the past 30 days reveals an even more dramatic reduction, from 39 percent in 1976 to 30 percent in 1982, suggesting that publicity on the harmful health effects of smoking may have had an impact. In addition, antitobacco messages may be associated with the reduction in marijuana smoking. However, while there is evidence of a downturn for some of the indicators, it is still too early to know if this is a temporary shift in rates or the beginning of meaningful trends toward lower levels of drug use. In addition to a downturn in use, 1980 data from the Monitoring the Future study reveals that variables that previously differentiated users from nonusers are also useful in differentiating types of multiple drug users. (Auth. Abs. Mod.)

86–0556. Coelho, R.J. **A Psychometric Investigation of the Multidimensional Health Locus of Control Scales With Cigarette Smokers.** *Journal of Clinical Psychology* 41(3):372-376, May 1985.

The psychometric properties of the Multidimensional Health Locus of Control (MHLC) Scales were examined with 146 chronic cigarette smokers who volunteered for treatment through a smoking cessation clinic. After participants completed the MHLC (Form A), the following analyses were conducted: (1) internal consistency (coefficient alpha) was determined by measuring each of the three subscales; (2) subscale items were totaled to determine each scale's total score and scores were correlated to estimate independence; and (3) responses to the 18 Internal, Powerful Others, and Chance scale items were subjected to principal-component factor analysis with communalities followed by a Varimax rotation. Results indicate that the MHLC instrument has a bidimensional orientation, with factors composed predominately of items that measure Internal and Powerful Others control expectancies. The absence of a Change locus of control dimension is considered to be a reflection of the population studied. The self-selected smokers were motivated to change their health behavior beyond that of chance. It is also thought that, owing to social expectations, subjects may have been inclined to endorse statements that described how they actually should be or would like to be.

86–0557. Davis, D.I. **Differences in the Use of Substances of Abuse by Psychiatric Patients Compared With Medical and Surgical Patients.** *Journal of Nervous and Mental Disease* 172(11):654-657, November 1984.

Psychiatric patients consistently showed higher quantity and frequency of drug abuse, including smoking, than a similar general medical and surgery patient population in a self-assessment survey of 3,300 patients of an urban university medical center. There were significantly more heavy cigarette smokers among the 300 psychiatric patients: 43.1 percent of male psychiatric patients smoked a pack or more of cigarettes/day compared with 26.4 percent of medical-surgical male patients. Among women, 29.5 percent of psychiatric patients smoked a pack or more cigarettes/day compared with 17.1 percent of medical-surgical patients. Use of alcohol, marijuana, and caffeine is also tabulated for both populations. (Auth. Abs. Mod.)

86–0558. DiFranza, J.R.; Winters, T.H. **Smoking and Drunk Driving. (Letter).** *New England Journal of Medicine* 313(22):1421-1422, November 1985.

A Massachusetts study showed that smokers were arrested for drunk driving three times more often than nonsmokers. Prevalence of smoking was compared among drivers arrested for drunk driving and drivers having no arrests during the preceding year. Persons convicted of driving while intoxicated were given a choice of losing driving privileges for 1 year or participating in an alcohol rehabilitation program. The 178 (90 percent) that chose rehabilitation and a random sample of 1,969 drivers applying for license renewals were surveyed by questionnaire on smoking habits and driving records. Data revealed that 124 of the drivers arrested for drunk driving (65 percent) described themselves as cigarette smokers compared with 701 (36 percent) of drivers with no arrests. Compared with nonsmokers, smokers had a relative risk of 3.4 of being arrested for drunk driving ($p < 0.0001$). Smoking and alcoholism are two forms of addiction associated with severe and often fatal health consequences. High incidence of drunk driving among cigarette smokers reflects the frequent coexistence of these two conditions, and may partly account for the higher incidence of motor vehicle accidents among smokers. (Auth. Abs. Mod.)

86–0559. Edwards, J.A.; Wesnes, K.; Warburton, D.M., et al. **Evidence of More Rapid Stimulus Evaluation Following Cigarette Smoking.** *Addictive Behaviors* 10(2):113-126, 1985.

Smoking was found to speed up stimulus evaluation processes among experienced male smokers (>15 cigarettes/day) who performed a rapid visual information processing (RVIP) task. The task required detection of sequences of three consecutive odd or even digits in a series presented singly on a TV screen at a rate of 100 digits/minute. Approximately 80 targets occurred every 10 minutes. All subjects took part in three test sessions: (a) baseline of 10 minutes on the RVIP task; (2) treatment phase of 10 minutes smoking one cigarette (0.9 mg or 1.5 mg standard machine delivery of nicotine) or not smoking (NS); and (3) posttreatment phase of 20 minutes on the task. Subjects abstained from smoking for at least 12 hours before the sessions. Smoking increased the number of correct detections and decreased response time compared with presmoking baseline and NS sessions. Analysis of vertex Event-Related Potentials to correct detections revealed a significant reduction in P300 latency following smoking compared with NS sessions. Findings are consistent with the common self-report by smokers that smoking aids concentration. (Auth. Abs. Mod.)

86–0560. Epstein, L.; Tamir, A. **Behavioral Risk Factors in Adolescence as a Basis for Health Planning.** *Israel Journal of Medical Sciences* 21(7):595-600, July 1985.

Smoking during adolescence, a major risk to health in adulthood, was the earliest and most prevalent behavioral risk factor among 1,000 Israeli high school students between 16 to 18 years of age. Other behavioral risks, i.e., hashish use, sexual activity, alcohol consumption, and use of analgesics, were found to be closely associated with cigarette smoking. Among 18-year-olds, 36 percent of boys and 31 percent of girls smoked cigarettes. An additional 20 percent were already ex-smokers. Of smokers, almost 30 percent had begun before the age of 13. Other data showed that (1) smoking among adolescents was clearly related to smoking by parents, siblings, and peers; (2) use of hashish (4.9 percent of boys and 1.1 percent of girls) was predominant among cigarette smokers; (3) 54 percent of boys and 36 percent of girls who smoked had experienced sexual intercourse compared with 20 percent of boys and 8 percent of girls who did not smoke; (4) 64 percent of boys and 39 percent of girls who had begun smoking by the age of 16 had also experienced sexual intercourse by the age of 18 compared with 20 percent of boys and 13 percent of girls who had not begun smoking; (5) 57 percent of boys who smoked by age 11 had had intercourse by age 18; and (6) 67 percent of boys who smoked also drank alcohol compared with 35 percent of nonsmokers. Use of medicines, particularly analgesics, was more prominent in smokers, drinkers, and hashish users. Cigarette smoking, sexual activity, use of hashish, and alcohol consumption were also found to be more prevalent among high school dropouts.

86–0561. Gritz, E.R.; Ksir, C.; McCarthy, W.J. **Smokeless Tobacco Use in the United States: Present and Future Trends.** *Annals of Behavioral Medicine* 7(2):24-27, 1985.

Increased use of smokeless tobacco (SLT) in the United States appears to be a lifestyle choice of male adolescence and young adulthood, possibly encouraged by role model advertising. After many years of small but steady declines, SLT use has increased (based on regional sampling) as much as 30 percent in some school populations, and has been positively correlated with cigarette smoking and alcohol use. SLT use is associated with increased risk of cancer of the oral cavity, pharynx, and esophagus, probably related to tobacco-specific nitrosamines (TSNA) that reportedly range from 5.5 to 106 ppm, the highest level of carcinogenic nitrosamines in a consumer product. Saliva of snuff dippers yielded TSNA levels at concentrations of 0.02 to 0.9 ppm. Tissue changes, leukoplakia, tooth discoloration, abrasion and wear, gingival recession, periodontal bone destruction, and hypokalemia have been detected in adolescent SLT users. State legislatures in Massachusetts, New York, Oregon, and Utah are leading the effort to curb SLT use, particularly among adolescents, through the use of health warnings. A national effort by legislators, health professionals, and educators is needed to avert further increases in SLT use.

86–0562. Grunberg, N.E.; Morse, D.E. **Cigarette Smoking and Food Consumption in the United States.** *Journal of Applied Social Psychology* 14(3):310-317, 1984.

An inverse relationship between cigarette smoking and body weight may be partially explained by changes in consumption of sweet-tasting high caloric food. Computed correlations between U.S. per capita consumption of cigarettes and 41 different foods during 1964 to 1977 and 1968 to 1973 were significantly negative for cigarettes and sugar and for a few other foods (beef, pork, and canned orange juice). Findings were corroborated by a human laboratory study that indicated increased consumption of high caloric foods by subjects abstaining from smoking. In an animal study of food and water consumption before and after nicotine administration, rats consumed greater amounts of sugar when nicotine was withdrawn. Changes in consumption of sweet-tasting foods paralleled changes in body weight during and after nicotine administration. It is suggested that finding effective ways to attenuate weight gains may provide practical encouragement for smoking cessation. (Auth. Abs. Mod.)

86–0563. Himbury, S.; West, R. **Smoking Habits After Laryngectomy.** *British Medical Journal* 291(6494):514-515, August 24, 1985.

Data on 171 laryngectomy patients (76 percent smokers) showed a high rate of smoking cessation following surgery. Laryngectomy has several consequences for smokers: smoke drawn into the mouth cannot be inhaled, nicotine cannot be absorbed from the lungs, and thus some of the health risks are reduced. After surgery, 40 percent of the smokers tried to resume smoking, but only 19 percent were actually consuming tobacco at the time of the survey. Reasons cited by those who tried to resume smoking but quit were loss of satisfaction (59 percent), health (21 percent), advice to quit (8 percent), and pain (4 percent). Two patients gave other reasons. Among continuing smokers, 40 percent were using pipes or cigars, which permit nicotine absorption from the buccal mucosa. There were 14 patients who continued to smoke cigarettes, despite apparently being unable to inhale the smoke; however, daily consumption was significantly lower than presurgical levels.

86–0564. Kneeshaw, M.F. **Smoking Cessation in Nurses: A Report on a Self-Selected Population at the Presbyterian Hospital in New York City.** *Occupational Health Nursing* 33(7):338-342, July 1985.

Survey questionnaires were distributed to 1,235 nurses and 181 (14.7 percent) were returned. Of these, 36 percent were smokers, 19.1 percent were ex-smokers, and 44.9 percent were never smokers. Among current smokers, 66 percent had smoked for >10 years; 54 percent consumed 11 to 20 cigarettes/day and 16 percent smoked ≥21 cigarettes/day; and 83 percent inhaled. Of 22 brands, the most frequently mentioned were Newport (10 percent), Merit (10 percent), Players (8 percent), and Marlboro Lights (8 percent). The majority (86 percent) smoked at work, and 61 percent felt that a "cigarette break" is an acceptable reason for a rest period; 39 percent disagreed. Some type of workplace smoking restriction was reported by 92 percent. It is noted that 78 percent indicated a desire to quit, 71 percent had tried at least once, and 61 percent planned to quit in the next 6 months. Reasons given for wanting to quit included health, presence of physical symptoms, cost, and social/peer pressure. When asked if they would attend a cessation program, 64 percent responded positively.

86–0565. Kozlowski, L.T.; Herman, C.P. **The Interaction of Psychosocial and Biological Determinants of Tobacco Use: More on the Boundary Model.** *Journal of Applied Social Psychology* 14(3):244-256, 1984.

Both the biological and the psychosocial pressures that influence smoking behavior must be considered in "teaching" smokers to reduce cigarette consumption. Biological factors include physiological demand to maintain minimum levels of nicotine, direct rewarding effects of tobacco, and toxic effects of excessive smoking. Psychosocial factors include voluntary, self-initiated controls and situational influences. These distinct pressures might easily be mistaken for each other if only the dose of tobacco smoke self-administered daily by a smoker is observed. A boundary model on regulation of drug intake is described, and several examples illustrate the relative importance of psychosocial and biological pressures on tobacco consumption and how they vary systematically as a function of treatment goals. Predominantly biological smoking (above the upper boundary or below the lower boundary on the model) and predominantly psychosocial smoking (between the boundaries) are responsive to different types of manipulations. In light of the model, problems and techniques commonly used in smoking control are reviewed, and inferential confusion faced by smokers and researchers are discussed. (Auth. Abs. Mod.)

86–0566. Linn, M.W.; Stein, S. **Reasons for Smoking Among Extremely Heavy Smokers.** *Addictive Behaviors* 10(2):197-201, 1985.

Four factors describing reasons for smoking (stress reaction, pleasure, social acceptance, and addictive/habitual needs) were identified in 200 men (40 to 60 years of age) who had smoked at least two packs of cigarettes/day for 20 or more years. When the factors were correlated with 15 specific reasons for smoking, the addictive/habitual needs factor correlated most often with increased use of tobacco, alcohol, and coffee. The pleasure factor was associated with obesity. The stress reaction factor was associated with more perceived stress and was also consistently correlated with more unfavorable ratings on psychological adjustment. People who smoked to alleviate stress or for addictive/habitual needs had made the most attempts to stop smoking. Those who smoked for pleasure had little motivation to stop. Findings suggest that among heavy smokers there are individual differences in reasons for smoking and that these need to be taken into account in trying to help such individuals. (Auth. Abs. Mod.)

86–0567. Mello, N.K.; Lukas, S.E.; Mendelson, J.H. **Buprenorphine Effects on Cigarette Smoking.** *Psychopharmacology* 86(4):417-425, August 1985.

Cigarette smoking increased during administration of buprenorphine (an opioid mixed agonist-antagonist) compared with drug-free baseline in seven heroin addicts maintained on buprenorphine for 24 days ($p<0.01$). Increases in buprenorphine dose (0.5 to 8.0 mg/day) were associated with significant increases in cigarette smoking at doses of 2.0 mg/day s.c. and above. Cigarette smoking during 10 days of buprenorphine maintenance at 8 mg/day was significantly higher than during the buprenorphine induction phase ($p<0.01$). Six subjects given placebo buprenorphine over 14 days showed no change in cigarette smoking. In a placebo group that self-administered heroin for 10 days, cigarette smoking increased significantly ($p<0.001$). The rate of cigarette smoking defined by intercigarette intervals was highest during the 10 days of high-dose buprenorphine maintenance or placebo plus heroin self-administration. Both groups requested significantly more cigarettes at intervals of 0 to 10, 11 to 20, and 21 to 30 minutes than during the drug-free baseline. Data confirm previous findings that opioid agonist administration is associated with increased cigarette smoking and suggest that buprenorphine has primarily agonist effects on cigarette smoking. (Auth. Abs.)

86–0568. Mello, N.K.; Mendelson, J.H. **Operant Acquisition of Marihuana by Women.** *Journal of Pharmacology and Experimental Therapeutics* 235(1):162-171, October 1985.

Tobacco smoking, marijuana use patterns, and operant acquisition of marijuana and money by 21 young women were studied. Women could earn one 1 g marijuana cigarette or 50 cents in 30 minutes of performance on a schedule of reinforcement. A 7-day drug-free baseline was followed by 21 days of marijuana availability and a postmarijuana drug-free period of 7 days. Sixteen marijuana users smoked tobacco. During the premarijuana base-line period, four heavy marijuana smokers consumed an average of 14±3.5 tobacco cigarettes/day; six moderate marijuana smokers, 14±3.7 tobacco cigarettes/day; and six occasional marijuana smokers, 13±3.9 tobacco cigarettes/day. Availability of marijuana had no significant effect on tobacco smoking in either heavy or moderate marijuana smokers throughout the 35-day study. Only occasional marijuana smokers increased tobacco smoking ($p<.02$) during marijuana availability and the postmarijuana drug-free period ($p<.01$). Tobacco cigarettes were smoked primarily between noon and midnight by all three groups. (Auth. Abs. Mod.)

86–0569. Murray, M.; Kiryluk, S.; Swan, A.V. **Relation Between Parents' and Children's Smoking Behaviour and Attitudes.** *Journal of Epidemiology and Community Health* 39(2):169-174, June 1985.

Survey data from about 6,000 adolescents (taken between 1974 and 1981) in the MRC/Derbyshire smoking study revealed substantial agreement between children's and parents' reports of smoking behavior and attitudes. Boys were significantly more likely to smoke if the parents were not opposed, regardless of actual smoking behavior. Girls were significantly more likely to smoke if one or both parents smoked, but there was no correlation between parental attitudes and girls' cigarette use. About 51 percent of single mothers and 66 percent of single fathers were smokers, compared with 38 percent of other mothers and 53 percent of other fathers. At all ages, adolescents from single parent families were most likely to smoke, regardless of parental smoking habits. Although about two-thirds of the parents held a favorable attitude toward smoking, only 5 percent were opposed to more health education campaigns. A fourth of the mothers who did not want their children to smoke were not perceived as being against smoking, while of those mothers who were not against cigarette use, only a third were perceived as permitting smoking.

86–0570. Post, B.; Kemper, H.C.G. **Energy and Nutrient Intakes, Eating and Smoking Practices.** *Medicine and Sport Science* 20:156-168, 1985.

Two percent of girls and 1 percent of boys begin to smoke at age 13, according a survey of eating and smoking practices among Dutch adolescents. At 17 and 18 years of age, the percentages are 38 for girls and 25 for boys. Consumption also increases, from 6 cigarettes/week for girls aged 14 to 15 to 63 cigarettes/week at age 17 to 18, and from 7 cigarettes/week for boys (14 to 15) to 99 cigarettes/week (17 to 18). Some adolescents smoked over 100 cigarettes/week. The percentage of boys who smoke is lower; the number of cigarettes smoked by boys is higher. The same trend is found in the adult population. It is recommended that measures be taken in health education to discourage young people from smoking. The report also discusses eating practices of adolescents, including daily intake of energy, protein, fat, carbohydrates, alcohol, minerals, and vitamins. The role that snacks play in providing daily intake is noted.

86–0571. Risner, M.E.; Goldberg, S.R.; Prada, J.A., et al. **Effects of Nicotine, Cocaine and Some of Their Metabolites on Schedule-Controlled Responding by Beagle Dogs and Squirrel Monkeys.** *Journal of Pharmacology and Experimental Therapeutics* 234(1):113-119, July 1985.

The behavioral effects of nicotine were compared with those of its metabolites nornicotine and cotinine in beagle dogs and squirrel monkeys responding under a multiple fixed-internal (FI, 300 second), fixed-ratio (FR, 30 response) schedule of food presentation. Nicotine (0.01 to 1.0 mg/kg) and nornicotine (0.03 to 3.0 mg/kg) produced qualitatively similar effects in both dogs and monkeys. Nicotine produced dose-related increases, then decreases in rates of responding during FI components; rates of responding during FR components were only decreased. Nornicotine produced only dose-dependent decreases in responding during both FI and FR components. In dogs, cotinine (0.01 to 10.0 mg/kg) produced only dose-dependent decreases in rates of responding during both FI and FR components. In monkeys, cotinine (0.1 to 3.0 mg/kg) increased responding during FI components; a dose of 30.0 mg/kg decreased responding during both FI and FR components. These experiments and similar tests involving cocaine and its metabolite norcocaine indicate that the metabolites are behaviorally active and may contribute to the pharmacological profile of the parent compound. (Auth. Abs. Mod.)

86–0572. Rodney, W.M.; Nutter, D.; Widoff, B. **Recording Patients' Consumption of Social Drugs in a Family Medicine Residency: A Longitudinal Study.** *Family Practice* 2(2):86-90, June 1985.

An audit of 954 medical records was conducted over a 5-year period in a university-based family medicine training program with the goal of improving physicians' compliance with recording of patients' social drug history. Instruction through lectures and reminders produced no changes in recording in the second year, but a significant improvement in notation of smoking and alcohol consumption was noted in the third through the fifth year, when models and dictation examples were provided. Visual cues in the medical record led to a significant improvement in notation of caffeine usage in the fourth year, an effect that was sustained for the fifth year. Additional audit sessions did not increase compliance with caffeine notation. Faculty and resident compliance with recording of social drug history were not significantly different. It is suggested that since prevention of disease secondary to social drug usage can be obtained by abstinence or moderation, the logical first step should be to instruct physicians during training to note presence or rate of social drug consumption. With this step in place, more effective studies to measure the outcome of patient education can be performed. (Auth. Abs. Mod.)

86–0573. Rose, J.E.; Tashkin, D.P.; Ertle, A., et al. **Sensory Blockade of Smoking Satisfaction.** *Pharmacology Biochemistry and Behavior* 23(2):289-293, August 1985.

Sensory cues accompanying inhalation of cigarette smoke are important determinants of immediate smoking satisfaction, but sustained effects of smoke intake on subsequent smoking behavior (30 minutes later) may be mediated by processes other than sensory stimulation of the respiratory tract, such as plasma nicotine levels. Cigarette smokers were presented with controlled doses of cigarette smoke to determine whether resulting reduction in cigarette craving depended upon perceiving sensory qualities of smoke. Cigarette craving was assessed before and after inhaling controlled doses of smoke in two conditions: (1) local anesthesia of the upper and lower respiratory airways, induced by mouth rinsing, gargling, and inhalation of a mist containing lidocaine (a topical anesthetic); and (2) no anesthesia control (saline solutions). A sham smoking procedure was presented in both conditions. Craving and ad lib smoking behavior were also assessed 30 minutes after controlled smoking. Results indicated that smoke, as opposed to sham puffs, significantly reduced reports of cigarette craving, and local anesthesia significantly blocked the immediate reduction in craving produced by smoke inhalation. Puffs were also rated as less desirable in the anesthesia condition. Craving was no different in either condition 30 minutes after smoking. However, craving and smoking intake in both conditions was less when smoke had been given previously than in the sham smoking control. (Auth. Abs. Mod.)

86–0574. Schaefer, S.D.; Henderson, A.H.; Glover, E.D., et al. **Patterns of Use and Incidence of Smokeless Tobacco Consumption in School-Age Children.** *Archives of Otolaryngology* 111(10):639-642, October 1985.

Smokeless tobacco use was perceived as less harmful (40 percent) than cigarette smoking (77 percent) by 5,392 junior and senior high school students in Texas who responded to an American Cancer Society multiple-choice questionnaire. Data also showed that 486 (9 percent) regularly used smokeless tobacco and 810 (15 percent) regularly smoked cigarettes; 4,096 (76 percent) used no tobacco products. Among smokeless tobacco users, 55 percent had started before the age of 13; only 36 percent of cigarette smokers had begun that young. Peer pressure (27 percent) and "looking grown up" (20 percent) were reasons cited for using smokeless tobacco. Less than half (42 percent) indicated advertisements influenced teenagers to start the smokeless tobacco habit. In regard to school policies and legal restrictions, students believed that using smokeless tobacco (28 percent) and cigarette smoking (34 percent) were permissible in schools; only 10 percent knew that buying dipping or chewing tobacco was illegal for them. Data show that 81 percent obtained tobacco from convenience stores and supermarkets. Geographic distribution was 70 percent urban and 30 percent rural, with a representative sampling of the various racial and ethnic groups within Texas. (Auth. Abs. Mod.)

86–0575. Sobal, J.; Valente, C.M.; Muncie, H.L., Jr., et al. **Physicians' Beliefs About the Importance of 25 Health Promoting Behaviors.** *American Journal of Public Health* 75(12):1427-1428, December 1985.

Elimination of smoking was ranked as very important (94 percent) among 1,715 Maryland physicians surveyed on attitudes and beliefs toward health-promoting behavior. Other important behaviors were wearing protective equipment or work clothing if exposed to harmful substances (82 percent), avoiding excess caloric intake (73 percent), eating a balanced diet (68 percent), and wearing seat belts (67 percent). The questionnaire listed 25 behaviors to be rated as very important, important, unimportant, or very unimportant in promoting the health of the average person. Information on medical specialty, year of medical school graduation, sex, and practice location was also requested. Behaviors believed to be very unimportant included taking vitamin supplements (34 percent), having an annual exercise test (33 percent), not drinking alcohol at all (32 percent), and having a baseline exercise test (19 percent). At least 25 percent of physicians also rated minimizing sugar intake, use of relaxation methods, annual physical examinations, regular aerobic activity, caffeine limitation, regular sleep, and eating breakfast as unimportant or very unimportant. Respondents included family/general practitioners (33 percent), internists (46 percent), and obstetricians/gynecologists (21 percent).

86–0576. Van Reek, J.; Drop, M.J.; Joosten, J. **Het Rookgedrag van Nederlandse Schoolkinderen en de Invloed van Leeftijdgenoten en Ouders. [The Influence of Peer Pressure and Parental Smoking Behavior Upon Smoking Among Dutch Schoolchildren.]** *Tijdschrift Voor Alcohol, Drugs en Andere Psychotrope Stoffen* 11(2):74-79, 1985, Dutch.

Smoking among 10- to 12-year-old schoolboys in the Netherlands decreased from 76 percent in 1907 through 1916 to 16 percent in 1981. Since 1978, smoking among boys and girls aged 12 to 14 years has also decreased. Regular smoking among schoolchildren is attributed to peer pressure and adult smoking habits. The strongest correlation is observed with smoking among neighborhood friends or smoking among older brothers and sisters. Differences in smoking behavior have been observed between children attending different types of schools. The lowest prevalence of smoking is found among children in higher types of schools. Because of strong peer pressure, it is considered doubtful that the decline in smoking can be attributed to antismoking campaigns among schoolchildren. Observed decreases are probably related to the circulation of antismoking information among adults and concomitant changes in their smoking behavior. (Auth. Abs. Mod.)

86–0577. Velicer, W.F.; DiClemente C.C.; Prochaska, J.O., et al. **Decisional Balance Measure for Assessing and Predicting Smoking Status.** *Journal of Personality and Social Psychology* 48(5):1279-1289, May 1985.

A Decisional Balance Sheet of Incentives, designed to evaluate cognitive and motivational aspects of human decision-making applied to cessation of smoking, appears to be a successful predictor of behavioral changes among smokers attempting to quit. A short questionnaire classified 960 smokers as (1) Immotive: currently smoking and no intention of quitting in the near future; (2) Contemplators: currently smoking and intending to quit within the next year; (3) Relapsers: currently smoking, but had quit for a period of at least 24 hours within the last 6 months; (4) Recent Quitters: currently not smoking, but had smoked within the last 6 months; and (5) Long-Term Quitters: currently not smoking, and had not smoked for at least 6 months. Two scales, identified as *Pros of Smoking* and *Cons of Smoking*, reliably differentiated stages of change in the quitting process between the five groups, and predicted smoking status at 6-month followup. It is suggested that the instrument can assess, describe, and predict behavior change in various contexts on the basis of perceived advantages and disadvantages of the decision. (Auth. Abs. Mod.)

86–0578. Von Meister, R.; Hinnah, V.; Schulte, H. **Rauchen und Bronchitis-Symptomatik in der Jungen Generation der Bundesrepublik Deutschland. [Smoking Habits and Respiratory Symptoms in the Young Population of the Federal Republic of Germany (FRG)].** *Atemwegs und Lungkrankheiten* 10(10):507-511, 1984, German.

Survey data from 2,471 young people (aged 15 to 25 years) in the Federal Republic of Germany show that (1) smoking increases from 20 percent at age 15 to 59 percent at 21 to 25 years in both males and females; (2) average starting age of cigarette smoking is 16.0 in boys and 16.5 years in girls, and more than 90 percent of young people start smoking before the age of 20; (3) mean consumption, 9 cigarettes/day at age of 15 for both sexes, increases to 19 cigarettes/day for males and 15 cigarettes/day for females over age 21; and (4) respiratory symptoms (cough, cough with phlegm, breathlessness), low in nonsmokers, increase significantly among smokers. There was a strong relationship between daily cigarette consumption and respiratory symptoms in both sexes; a sixfold increase in cough, tenfold increase in cough with phlegm, and twofold increase in dyspenea in heavy smokers (>20 cigarettes/day) compared with nonsmokers. The survey was conducted in 1981 and 1982. (Auth. Abs. Mod.)

86–0579. Westman, M.; Eden, D.; Shirom, A. **Job Stress, Cigarette Smoking and Cessation: The Conditioning Effects of Peer Support.** *Social Science and Medicine* 20(6):637-644, 1985.

Social support may be detrimental to smokers, depending on the smoking attitudes and behaviors of the "supportive" others. Relationships between questionnaire measures of job stress and smoking intensity (SI) and cessation were studied among 560 disease-free male smokers and 310 ex-smokers. The main-effect hypothesis that stress is positively related to SI and negatively related to cessation received some support in correlational and multiple regression analyses. Hours of work, work addiction, lack of influence, intrinsic impoverishment, and lack of support were positively associated with SI. Conflict, responsibility, hours of work, low status, lack of influence, and harsh working conditions were negatively associated with cessation. People reporting low peer support were found to smoke significantly more than those who reported high support. Additionally, additive main effects but no interactive effects on SI were observed between hours of work and peer support. Average consumption by people who worked less than 8 hours and reported high support was 17 cigarettes/day. People who worked more than 8 hours and reported low support smoked an average of 22 cigarettes/day. No buffering effect of peer support on the relationship between stress and both SI and smoking cessation was observed. However, for respondents reporting low support, more job stressors were negatively related to cessation than among those reporting high support, confirming the support-buffer hypothesis. (Auth. Abs. Mod.)

See also **86–0369**

SMOKING PREVENTION AND INTERVENTION

86–0580. Allendorff, S.; Sunseri, A.J.; Cullinan, J., et al. **Student Heart Health Knowledge, Smoking Attitudes, and Self-Esteem.** *Journal of School Health* 55(5):196-199, May 1985.

A comprehensive risk-reduction program for cardiovascular disease (Chicago Heart Health Curriculum), which studied multiracial urban sixth graders and their families, found that independence of peers significantly influenced smoking attitudes and self-esteem. Three significant independent variables (independence of peers, health attitudes, teacher race) accounted for 23 percent of the variance in student pretest smoking attitudes. Independence of peers was most prominent among predictor variables, while the race effect for black teachers was small. Thirty-six percent of variance in student posttest smoking attitudes was explained. As in pretest analysis, the variable with the highest impact was independence of peers, having an even greater effect than pretest smoking attitudes. Students' general health attitudes again contributed significantly to the variance. Results suggest that future programs conveying heart health knowledge should consider student learning in the affective context of self-esteem, independence of peers, and teacher humanism. Reinforcement through continual intervention over a prolonged period may produce more permanent change over time. (Auth. Abs. Mod.)

86–0581. Behrens, R.A. **No Smoking. A Decision Maker's Guide to Reducing Smoking at the Worksite.** U.S. Department of Health and Human Services, Public Health Service, Office of Disease Prevention and Health Promotion and Office on Smoking and Health, 1985, 46 pp.

This booklet offers suggestions on ways to reduce worksite smoking, which can result in short-term losses of 300 to 350 dollars annually for each smoker. Including long-term losses would make the figure even higher. The steps required to reduce worksite smoking will depend on many factors, including measures already taken, special occupational hazards to be considered, employee attitudes, union contracts, and group willingness to start a program. In addition to the health and economic consequences of smoking, the guide discusses how employees feel about smoking on the job; benefits of a smoking policy and program; laws and court decisions that support smoking restrictions and bans; successful worksite smoking policies and worksite smoking cessation programs; results that can be expected from a smoking cessation program; incentives that companies offer to help smokers quit; how a company can start (or increase) efforts to reduce smoking; selecting a qualified provider of smoking cessation programs; and involving employees in developing a smoking policy and program. Successful smoking policies of several large companies are described and examples of businesses with successful smoking cessation programs are provided, including businesses that used stop-smoking incentives successfully. Voluntary and Government agencies interested in control of worksite smoking are listed, including information on available materials and services.

86–0582. Best, J.A.; Flay, B.R.; Towson, S.M.J., et al. **Smoking Prevention and the Concept of Risk.** *Journal of Applied Social Psychology* 14(3):257-273, 1984.

Sixth grade children in 22 schools receiving either a social influences smoking prevention program or routine health education were studied for program impact. The intervention program was designed to teach youth about peer, parent, and media influences affecting smoking onset and to provide them with resistance skills. Program impact was evaluated as a function of pretreatment risk of future smoking. Risk was defined with respect to (1) prevalence of social models who smoked and (2) previous smoking experience. Results after 2.5 years show program impact to vary with both kinds of risk. Smoking experience risk interacted so that at first there was greater impact on children with experience, but later the pattern reversed, with the greater treatment effects seen for those with limited experience initially. Social models risk showed a direct relationship, with greater risk being associated with greater program impact. Implications for evaluation research and prevention programs are discussed. (Auth. Abs. Mod.)

86–0583. Calman, A.L.H.; Carmichael, S.; Deans, H.G., et al. **Development of a Primary School Health Education Programme With Special Emphasis on the Prevention of Cigarette Smoking.** *Health Education Journal* 44:65-69, 1985.

"Jimmy on the road to super health," is a moderately successful health education program that places special emphasis on prevention of smoking. Prior to program development, 459 teachers in Glasgow (Scotland) primary schools were surveyed on health education training and priorities and on attitudes toward teaching antismoking material. Data were used in developing a serialized story, for 10- and 12-year-olds, about a young boy and his adventures in developing good health habits. Antismoking themes, woven into the seven episodes, emphasize the detrimental effects of smoking on heart and lungs and on taste, smell, and appetite. Decisionmaking and resistance to peer pressure are also addressed. Using feedback from teachers, the pilot program was revised after initial evaluation in 10 schools. Results indicate that the health education program was effective in deterring at least some children from smoking.

86–0584. Christenson, P.D. **An Evaluation of Quantitative and Qualitative Assessment Techniques on the Impact of the**

SERR Curriculum. *Journal of School Health* 55(5):200-204, May 1985.

Effectiveness of a smoking risk reduction program for sixth grade students using a pretest/posttest control group design with a nonequivalent control group was measured. Knowledge of health consequences of smoking, decisionmaking, resistance-to-persuasion skills, and tobacco use was analyzed quantitatively and program implementation, participant views of the program, and program effects were analyzed qualitatively. Quantitative data were analyzed in terms of consistency with qualitative data. Analysis of quantitative results revealed significant differences between groups on smoking knowledge, decisionmaking skills, and resistance-to-persuasion skills. Qualitative results substantiated quantitative results, and revealed overall participant satisfaction, but also a need for a close working relationship between teachers and state and local health educators, reorganization of the curriculum, and relinquishing of curriculum to school districts for self-scheduling and organization. Utilization of both methods of analysis yielded a closer estimate of total program impact than if only one method had been used. (Auth. Abs. Mod.)

86-0585. Doxiadis, S.A.; Trihopoulos, D.V.; Phylactou, H.D. **Impact of a Nationwide Anti-Smoking Campaign.** *Lancet* 2(8457):712-713, September 28, 1985.

The design, implementation, and effectiveness of a national antismoking campaign in Greece are described. The campaign began in 1978 with a ban on cigarette advertising on television and radio accompanied by voluntary restrictions implemented by a few newspapers. The campaign became active in 1979 with antismoking propaganda broadcasted regularly on television and radio. Match boxes showed the pictorial message "smoking or health, choose," and hundreds of posters and booklets were circulated through schools, health centers, and other locations. A random sample of 1,500 adults interviewed in 1981 revealed that 96 percent were fully aware of the campaign and 10.5 percent who regularly smoked at the start of the campaign had stopped completely. During the two campaign years, 1979 and 1980, there was virtually no increase in the consumption of tobacco. The normal increase is about 6 percent. Following a change in government that occurred toward the end of 1981, advertising bans were maintained but the active antismoking campaign was stopped. This action resulted in a subsequent rise in tobacco consumption that approached and then exceeded precampaign levels.

86-0586. Evans, R.I.; Raines, B.E.; Hanselka, L. **Developing Data-Based Communications in Social Psychological Research: Adolescent Smoking Prevention.** *Journal of Applied Social Psychology* 14(3):289-295, 1984.

The gathering of preintervention data from a sample of junior high school students, and how data were used to create trigger films that were an important element in the prevention program, is described. Coping techniques used by adolescents who were successful in resisting social pressures to smoke were determined from preintervention group interview role-playing sessions with samples of students representative of the intended target population. Data were used in the production and editing of 10-minute sound and color films. The resulting 25 minutes of film was screened for students to evoke responses from an audience similar to the one to whom the film would be shown. In its final 10-minute form, the film simulates actual situations that illustrate specific strategies employed by seventh grade students to resist pressures to smoke. The coping strategies portrayed appear to be promising components of smoking deterrent programs for adolescents. (Auth. Abs. Mod.)

86-0587. Ferguson, B.; Ersted, S. (Editors). **The Path to Nonsmoking. Summary of the Minnesota Plan for Nonsmoking and Health.** Minnesota Department of Health, Center for Nonsmoking and Health, Minneapolis, 1985, 24 pp.

Nonsmoking in Minnesota is being actively promoted through specific strategies and recommendations in five specific areas: (1) schools and youth, (2) public information and education, (3) public and private regulation, (4) economic incentives, and (5) informational needs. Among the recommendations included in the plan are (1) nonsmoking classroom instruction at the seventh grade level, school regulation of smoking consistent with Minnesota law, and curriculum on nonsmoking coordinated for classroom and home television; (2) nonsmoking promotion through public information campaigns, including dissemination of scientific information on a regular basis by health organizations with physician support; (3) establishment of employee nonsmoking policies exceeding requirements of the Minnesota Clean Indoor Air Act in all health facilities, with a goal of smoke-free buildings by the year 1990, discouragement of tobacco product sponsorship of public events, and support of Federal antismoking legislation, including promotion of self-extinguishing cigarettes; (4) increase of Minnesota's cigarette excise tax by 10 cents/pack during fiscal 1986 and by 5 cents more each year for the following 5 years, and encouragement of discounts, incentives, options, and benefits to nonsmokers by insurance companies; and (5) establishment of a health and smoking database as a resource for research on nonsmoking.

86-0588. Gamboa, G.C. **The Dentist's Role in Oral Cancer Prevention and Patient Behavior Modification.** *CDA Journal* 13(5):50-51, May 1985.

Health care professionals, particularly dentists, have an excellent forum for motivating patients to stop smoking and for assisting in positive behavior modification. Of four basic methods (coercion, manipulation, persuasion, and facilitation), persuasion, the most common, is the force behind peer pressure and most advertising. Dentists have excellent opportunities for persuasive communication, and even brief counseling by dentists has proved helpful in getting patients to stop using tobacco. It is suggested that dentists should be nonsmokers, well versed in the effects of tobacco use, and aware of a patient's motivation for smoking (six types of smokers, as defined by the American Cancer Society, are described). The following persuasive approach is suggested: (1) the patient should be exposed to multiple, short, verbal messages on the effects of tobacco use; (2) the presentation should be concise, emphatic, and supported by literature; (3) comprehension should be tested and reinforced, stressing positive effects of quitting; and (4) the message should be repeated for retention. Additional support through antismoking groups and use of nicotine chewing gum are discussed.

86–0589. Gutzwiller, F.; Nater, B.; Martin, J. **Community-Based Primary Prevention of Cardiovascular Disease in Switzerland: Methods and Results of the National Research Program (NRP 1A).** *Preventive Medicine* 14(4):482-491, July 1985.

Lifestyle risk factor changes on a communitywide scale were proved feasible in a Swiss cardiovascular disease intervention program when a significant number (26.2 percent) of regular smokers quit and patients with hypertension were brought under control. The National Research Program 1A on Primary Prevention of Cardiovascular Disease involved two towns (12,000 inhabitants in each) in the French-speaking area and two (16,000 inhabitants in each) in the German-speaking part of the country for either intervention or comparison. Data on smoking habits, obtained from questionnaires, determined tobacco amounts as 1 g/cigarette, 2.5 g/cigarillo or pipe, 4 g/Stumpen, and 5 g/cigar. In intervention towns, 26.2 percent of regular smokers quit compared with 18.1 percent in reference towns. In the four towns, the proportion of smokers who quit was higher than that of nonsmokers who started the habit. Results were statistically significant only in the sample from intervention towns ($p<0.001$). It was found that light or moderate smokers tended to stop smoking more frequently than heavy smokers. The program, with extensive involvement of diverse community groups, has enjoyed continued support even after the end of the research experience, thus demonstrating the viability and acceptability of community-oriented preventive action. (Auth. Abs. Mod.)

86–0590. Hirvonen, L. **Smoking Cessation by the Five-Day Plan in Finland.** *Acta Universitatis Ouluensis,* Series D, Medica No. 123, Medica Publica No. 4. Oulu, Finland, University of Oulu, 1984, 180 pp.

Success in cessation of smoking by the Finnish 5-day plan was evaluated from questionnaires sent to 1,800 participants. Abstinence was 81.7 percent among those who were present at the final session; 57.2 percent of the total participants (0.2 to 0.3/1,000 population). One year later, 32.6 percent (18.7 percent of all participants) were still ex-smokers. Results were more favorable for small groups. Women began smoking later and smoked less than men, and their immediate cessation rate was equal to that of men, but women relapsed more easily. Irritability, reduced concentration ability, and sense of hunger were common withdrawal symptoms among men; gastrointestinal symptoms were common among women. Both the immediate and 1-year results correlated significantly with attendance at sessions. Relapse was triggered mainly by a strong craving and by alcohol among males and physical symptoms among females. Most recidivists and continuing smokers were willing to try again and believed in success. Good long-term prognosis was predicted by male sex, long previous nonsmoking periods, regular course participation, interest in medical aspects of smoking, rapid abstinence, mild or absent withdrawal symptoms, weak craving during the course, and rapid recovery of taste and smell. Withdrawal therapy plays a minor role in the general reduction of smoking, but it is an important aid for a limited number of smokers. (Auth. Abs. Mod.)

86–0591. Holme, I.; Hjermann, I.; Helgeland, A., et al. **The Oslo Study: Diet and Antismoking Advice. Additional Results From a 5-Year Primary Preventive Trial in Middle-Aged Men.** *Preventive Medicine* 14(3):279-292, May 1985.

In 1,232 high-risk, middle-aged men (80 percent smokers) participating in the Oslo prevention trial there was a 47 percent reduction in incidence of first major coronary heart disease (CHD) compared with controls. Although a net difference of 10 percent in serum cholesterol between groups was the main factor, smoking cessation (24 percent in the intervention group vs. 17 percent in controls) also contributed to the reduction. Antismoking advice was particularly effective in lower socioeconomic class men in the intervention group. Among those who quit smoking, more lower social class men reduced serum cholesterol than higher social class men. However, in the whole intervention group higher status men had at least as great a reduction in serum cholesterol as did lower status men. Dietary information was particularly important in preventing weight gain following smoking cessation. At 8.5- and 10-year follow-up, there were 7 and 10 cases of CHD (nonfatal and fatal myocardial infarction and sudden death) in the intervention and control groups, respectively. For the entire study period there were 25 and 45 CHD cases and 19 and 31 deaths, respectively. (Auth. Abs. Mod.)

86–0592. Journal of the American Medical Association. **Cessation of Smoking and Reduced Risk of Death. (Letter).** *Journal of the American Medical Association* 254(18):2555-2556, November 1985.

Multiple Risk Factor Intervention Trial (MRFIT) data support the large body of evidence that indicates smoking cessation will result in reduced risk of death. The MRFIT was not designed to estimate the effects of individual interventions. Special intervention participants were exposed to three principal modes of intervention simultaneously. The MRFIT did not have sufficient power to assess the relative impact of smoking cessation between special intervention and usual care participants, and was limited in its ability to test the combined effectiveness of interventions employed because of a lower than anticipated death rate in the usual care group and of a possible adverse effect of hypertension treatment in a sizable subgroup of randomized participants. Controlling for confounding variables in such analyses is important, e.g., reported smoking data can be unreliable. Initial smoking status is also important, since light smokers are more likely than heavy smokers to quit, and cigarette smoking is a strong risk factor for the disease end points considered. Cigarette cessation data (tables are reprinted) were adjusted for serum thiocyanate levels because of concern for reliability of reports. Also, MRFIT findings are consistent with more recent data that reduced risk owing to smoking cessation is not accounted for by baseline differences between quitters and continuing smokers. (Auth. Abs. Mod.)

86–0593. Kibelstis, J.A. **Tobacco Advertising and Waiting Room Magazines. (Letter).** *Journal of the American Medical Association* 254(18):2557, November 1985.

Journals that advertise tobacco should be banned from physicians' offices and waiting rooms. A concerted effort on the part of physicians to eliminate smoking would be facilitated by removing from waiting rooms the popular magazines that advertise and advocate the use of tobacco. The many quality magazines available that do not carry such advertisements deserve physician support.

86–0594. Kornitzer, M.; Rose, G. **WHO European Collaborative Trial of Multifactorial Prevention of Coronary Heart Disease.** *Preventive Medicine* 14(3):272-278, May 1985.

The World Health Organization (WHO) European Collaborative Trial of multifactorial prevention of coronary heart disease (CHD) in occupational groups reports net average reductions in intervention factors of 8.9 percent for daily cigarette consumption, 1.2 percent for plasma cholesterol, 0.4 percent for weight, 2.0 percent for systolic blood pressure, and 11 percent for a combined estimate of CHD risk. The randomized trial, over a period of 5 to 6 years, involved 66 factories (49,781 men ages 40 to 59) in the United Kingdom, Belgium, Italy, and Poland. Net changes in the percentage of smokers among all men (and high-risk men) were -4.5 (-10.2) in the United Kingdom, -1.7 (-6.5) in Belgium, +2.3 (-5.5) in Italy, +1.3 (+2.0) in Poland, and -1.9 (-6.8) overall. Corresponding changes in daily cigarette consumption were -15.6 (-18.7), -3.7 (-10.8), -5.5 (-9.5), -5.9 (-21.8), and -8.9 (-14.2), respectively. A net overall reduction of 7.4 percent in fatal CHD and 2.7 percent in total deaths was observed. The benefits of intervention were higher in centers achieving greater risk factor reductions. In Belgium, the net decreases in CHD incidence and total deaths were significant ($p < 0.05$).

86–0595. Lehrl, S.; Trell, E.; Luban-Plozza, B., et al. **Smoking Control Programmes. Synopsis of 2nd Session.** *European Journal of Respiratory Diseases* 66(Supplement 139):35-38, 1985.

Psychological aspects of smoking, antismoking methods and campaigns, and compliance of smokers were the focus of the second session of the international symposium "Tobacco Smoke: Respiratory Tract Defense Mechanisms and Therapeutic Implications." The smoker is viewed as a whole individual (i.e., personality, psychological makeup, and behavior), and it is suggested that smoking cessation methods include not only information but also clinical and therapeutic treatment and social measures. A survey of males born in 1927 showed that ex-smokers knew the most and smokers the least about the health dangers of smoking. Carboxyhemoglobin levels in blood, indirectly assessed by carbon monoxide content in exhaled air, is proving a better risk indicator for future smoking-related diseases than consumption level. Screening programs and investigations are adopting this method, particularly since the average smoker is inclined to interpret carbon monoxide as a health threat. Because 15 is the average age of smoking initiation, the focus of antismoking campaigns should be on youth. Legislative and social aspects of smoking also need to considered, and (for public acceptance) the best combination appears to be education backed by legislation. It is imperative that government action be combined with effective support from private organizations, antismoking leagues, and national and international medical associations.

86–0596. Miller, E.F. **Treatment of Tobacco Dependency. (Letter).** *New England Journal of Medicine* 313(19):1233-1234, November 1985.

Treatment for tobacco abuse must become part of the mainstream of substance abuse treatment, which has made great strides in treatment for alcoholism and other drug abuse. Policymakers at state and national levels need to formulate and implement policies that include smoking cessation as a covered service. The current method of certifying substance-abuse counselors in many states could be expanded to enable addressing nicotine dependency. Arrangements could also be made to certify people currently providing individual and group counseling for cigarette smoking cessation. Inclusion of treatment for tobacco use as a legitimate substance-abuse service may provide a "safe" entry point into the system for abusers of other substances. Including tobacco dependency in substance abuse treatment sends the message to the public, and children, that smokers are victims of an industry whose product is addictive and dangerous when used as intended. As the nation's number one preventable health problem, nicotine dependency deserves such consideration.

86–0597. Murray, D.M.; Luepker, R.V.; Johnson, C.A., et al. **The Prevention of Cigarette Smoking in Children: A Comparison of Four Strategies.** *Journal of Applied Social Psychology* 14(3):274-288, 1984.

Smoking prevention programs that teach adolescents specific skills for resisting social pressures to smoke and provide information on the short-term physiological consequences of smoking are more effective than programs concentrating on long-term consequences. Such programs are even more effective if adolescent peers are used as teachers. Two studies (7,000 students) investigated social influences on smoking onset among adolescents, with emphasis on long-term physiological effects of smoking. In each study, four treatment strategies were compared for effectiveness in deterring smoking onset and in minimizing future smoking levels. In four schools, classroom activities were led by peers selected by classmates and trained at the University of Minnesota (adult teachers served only as facilitators). Students were surveyed for smoking habits at the beginning of seventh grade. Posttest data were gathered the following May and a followup survey was conducted 1 year later. Self-reports of smoking were validated by saliva thiocyanate and expired alveolar air carbon monoxide measurements among adolescents aged 11 to 17. Use of peers as teachers was clearly more advantageous, indicating that adolescents appear to learn social skills more effectively from one another.

86–0598. Rankin, D.W. **Smoking in Hospitals—Attitudes and Practices.** World Health Organization, WHO/SMO/85.2, 1985, 19 pp.

Survey results from 27 countries on attitudes and practices of hospitals concerning smoking found that (1) most hospital authorities acknowledge that hospitals should be promoting nonsmoking and performing an exemplar role; (2) some hospitals have nonsmoking policies and some are experiencing difficulties in implementation; (3) sales of cigarettes are permitted on the premises of a significant number of hospitals; and (4) few hospitals participate in sustained smoking cessation programs. The following steps are recommended: (1) legislation should be enacted requiring hospitals to formulate acceptable antismoking policies and such policies should be implemented within a definite period of time; (2) sales of tobacco products on hospital premises should be forbidden; and (3) appropriate health promotion agencies should assist hospitals in carrying out sustained smoking cessation programs. (Auth. Abs. Mod.)

86–0599. Schinke, S.P.; Gilchrist, L.D. **Preventing Cigarette Smoking With Youth.** *Journal of Primary Prevention* 5(1):48-56, Fall 1984.

Sixth grade students in the skills-building group had better posttest scores on cognitive and interpersonal precursors of nonsmoking than students in an attitude modification group or controls. A repeated measures control group design compared skills building with an attitude modification approach for prevention of smoking among 234 sixth graders. All students (including those in the control condition) learned health and age-relevant information about cigarette smoking from films and from testimonials of junior high school students. In the skills building group, students also learned to manage temptations and urges to smoke by watching leaders, viewing videotapes of peers who avoided smoking under difficult conditions, and role-playing in simulated peer group settings. Students in the attitude modification condition learned to weight the merits of nonsmoking by competing in oral quizzes and contests in which they separated smoking-related myths from facts and brainstormed creative reasons for nonsmoking. They also performed antismoking skits, and at the last group session, publicly committed themselves to not smoking. Greater pretest to posttest changes in cigarette use were reported for students in the attitude modification condition than for skills-building and control condition students. Students in the skills-building group had lower reported increases in cigarette use from posttest to 6 months and from 6 to 12 months. (Auth. Abs. Mod.)

86–0600. Seltzer, C.C. **Cessation of Smoking and Reduced Risk of Death. (Letter).** *Journal of the American Medical Association* 254(18):2555, November 1985.

The suggestion that men in the MRFIT who quit smoking had a coronary heart disease (CHD) mortality rate almost 50 percent below that of continuing smokers is challenged. The unique character of the MRFIT was its randomized controlled design adopted expressly to avoid the problem of selection bias, confounding factors, and other uncertainties. A decline in coronary deaths in quitters vs. continuing smokers is based on a devolutionary derivate of MRFIT data worked into the form of a prospective "observational" study, a type of analysis that is vulnerable to flaws owing to self-selection bias and confounding factors. It is because observational data on ex-smokers are recognized as being unreliable that investigators have turned to randomized controlled intervention experiments such as MRFIT, which was designed to test the effect of a multifactor intervention program relative to cigarette smoking, elevated serum cholesterol levels, and hypertension. Results showed no evidence that cessation of smoking reduced risk of CHD mortality. The MRFIT report stated that "the overall results do not show a beneficial effect on CHD or total mortality from this multifactor intervention." (Auth. Abs. Mod.)

86–0601. Walter, H.J.; Hofman, A.; Connelly, P.A., et al. **Primary Prevention of Chronic Disease in Childhood: Changes in Risk Factors After One Year of Intervention.** *American Journal of Epidemiology* 122(5):772-781, November 1985.

A 5-year program for primary prevention of chronic disease, consisting of a curriculum focusing on cigarette smoking, nutrition, and physical fitness, was initiated in 1980 in 22 elementary schools in the Bronx, New York. Participants were 2,283 fourth graders randomly assigned by school to receive the "Know Your Body" program (n=14) or to a control condition (n=8). The intervention group (1.3 percent current smokers) had a mean serum thiocyanate value of 38.6 μmol/L; controls (1.0 percent current smokers) had a mean serum thiocyanate level of 34.6 μmol/L. At 1-year followup (1) mean thiocyanate level had decreased in the intervention group (36.8 μmol/L) and had increased in the control group (37.6 μmol/L); (2) systolic blood pressure had increased less in the intervention group than among controls; (3) diastolic pressure had decreased in both groups, but more in intervention than control subjects; and (4) total cholesterol had decreased in the intervention group and increased among controls. Observations indicate that although the effects were relatively small, the intervention appears to have had favorable effects on risk factors. In addition, the program proved feasible and was acceptable to school personnel, students, and parents.

86–0602. Williams, B.T.; Birch, S. **Impact of Nationwide Anti-Smoking Campaign. (Letter).** *Lancet* 2(8460):890, October 1985.

The Athens group may have been too optimistic about the impact of the Greek antismoking campaign. Reported relative prices of all commodities over time (CPI) and of tobacco (TPI) failed to include a measure of purchasing power. If growth in income was restrained while prices rose, the public may have chosen to buy less tobacco. Faced with a discontented electorate, an outgoing government often boosts incomes before an election in hopes of regaining electoral favor, a factor that might explain the upturn in the rate of increase of tobacco consumption in pre-election, post-campaign Greece. A definition of tobacco consumption, i.e. retail sales vs. products leaving the warehouse, might explain possible lag-time effects on reported statistics. Trends in growth of consumption are also inadequately explained; reduction in growth between 1982 and 1983 (when the campaign had been scaled down) are just as impressive as the effect between 1978 and 1979 (the first year of the full-scale campaign). Effectiveness of the campaign is measured by the 10.5 percent rate of smoking cessation, but no information is given about the rate of cessation in noncampaign years, nor about changes in rate of smoking initiation before or during campaign years. More data is needed before the campaign can be credited with any reduction in the tobacco use.

SMOKING CESSATION METHODS

86–0603. Benevolo, E.; Carbone, R.; Mantero, A. **Contributo Alla Prevenzione Dell'Abitudine di Fumare Sigarette per Mezzo di Somministrazione di Gomma da Masticare Contenente Nicotina. [Contribution to the Prevention of Cigarette Smoking by Administration of a Nicotine-Containing Chewing Gum.]** *La Clinica Terapeutica* 114(694):99-104, 1985, Italian.

Efficacy of nicotine chewing gum (Nicorette) as an aid to control smoking was confirmed in a study involving 18 volunteers during a 30- to 90-day treatment program. The study confirmed the efficacy of treatment with the product, and underscored the positive aspects and the correct ways to use the product to avoid possible side effects. (Auth. Abs. Mod.)

86–0604. Carter, D.E. **Nicotine Chewing Gum. Is This the Answer?** *Current Therapeutics* 26(6):21-23,27, June 1985.

Nicotine chewing gum may be effective as an aid to smoking cessation in special settings such as smokers' clinics, but when it is used in general practice, the results are less certain. However, success rates of 15 to 25 percent abstinence at 1-year followup can be achieved with nicotine chewing gum and simple support and encouragement. M.A.H. Russell, the champion of nicotine gum in Britain, claims a success rate of 47 percent abstinence at 1-year followup compared with 21 percent among nonusers. Use of the gum with concomitant participation in a behavioral modification program is more efficacious because (1) smokers attending a smoking cessation clinic are highly motivated; (2) gum use requires careful explanation and encouragement; (3) many people have the unrealistic hope that the gum will satisfy them in the same way as cigarettes; and (4) many people hope the gum will allow them to give up smoking easily and with little effort. Nicotine gum can help smokers cope with nicotine dependency, but it is not a simple cure.

86–0605. Cummings, K.M.; Jaen, C.R.; Giovino, G. **Circumstances Surrounding Relapse in a Group of Recent Exsmokers.** *Preventive Medicine* 14(2):195-202, March 1985.

Findings suggest that pharmacological influences associated with nicotine withdrawal play an important role in early relapse, while psychological aspects are the main factors in later relapse. Study participants were identified from among 107 smokers who attended the Roswell Park Memorial Institute stop-smoking clinic between November 1982 and April 1983. Of 99 smokers who quit smoking and were interviewed 1 year after completing the clinic, 69 (70 percent) reported smoking at least 1 cigarette during the followup period. Most relapses occurred during the first week following cessation (19 percent) and two-thirds occurred during the first 3 months (68 percent). Results indicate that circumstances leading to relapse varied as a function of time abstinent. Withdrawal symptoms and cigarette craving were the most frequently cited reasons among first-week relapsers. Coping with crisis situations and exposure to smoking triggers, such as the presence of other smokers and consumption of alcohol and coffee, were the main reasons given for relapse after the first week. Implications for relapse prevention are discussed.

86–0606. Hall, S.M.; Tunstall, C.; Rugg, D. **Nicotine Gum and Behavioral Treatment in Smoking Cessation.** *Journal of Consulting and Clinical Psychology* 53(2):256-258, April 1985.

Smokers with high blood cotinine levels were more likely to be helped by nicotine gum than were less dependent smokers. White, middle class, college-educated men (n=64) and women (n=56) who smoked an average of 30.5 cigarettes/day were assigned to (1) intensive behavioral treatment, (2) nicotine gum in low-contact treatment, or (3) behavioral treatment plus nicotine gum. Subjects met in small groups (5 to 6 persons) with one of two psychologists experienced in treatment of tobacco dependence. Combined treatment produced higher abstinence rates than the other two conditions at all assessments. Differences were significant at 3, 12, and 26 weeks from study start, but not at 52 weeks. However, more subjects with high cotinine levels in combined treatment were abstinent (50 percent) at the end of year than high-cotinine subjects in low-contact treatment (28 percent). Nicotine dependence was assessed by blood cotinine levels, scores on a dependence scale, and number of cigarettes smoked at pretreatment. (Auth. Abs. Mod.)

86–0607. Huggan, D.K. **Smoking and Hypnosis. (Letter).** *Practitioner* 229(1405):603, July 1985.

The following comments are added to the conclusions of a previous article on hypnotherapy in smoking cessation (*Practitioner* 229(1399):29-31, January 1985): (1) the hypnotherapist's role is to help the patient quit, not make him/her quit; (2) time given to discussion of the nature of hypnotherapy and aspects of withdrawal is of great benefit; (3) instructing patients to have a foul taste in their mouths if they continue to smoke is to many a challenge that will be tested; (4) the claims of smokers that cigarettes have a calming effect is in reality a subconscious (Freudian) attempt to recover the comfort and security felt by a baby after feeding; and (5) motivation is the primary factor in success. It is noted that although insufficient motivation is a good predictor of failure, differences in motivation alone do not account for the varying degrees of success observed with hypnotherapy. Elements such as hypnotherapist/patient rapport are also important, although such factors are not quantifiable and make comparison of results difficult. See also 85-1218.

86–0608. Hughes, J.R.; Pickens, R.W.; Spring, W., et al. **Instructions Control Whether Nicotine Will Serve as a Reinforcer.** *Journal of Pharmacology and Experimental Therapeutics* 235(1):106-112, October 1985.

Studies that examined self-administration of nicotine among ex-smokers given concurrent access to nicotine (2 mg) and placebo gums during the first 2 weeks of abstinence concluded (1) oral nicotine can serve as a reinforcer in humans; (2) instructions can control the ability of nicotine to serve as a reinforcer; and (3) instructions can control the abuse liability and therapeutic efficacy of a drug. In the first study, in which subjects were told they would receive either nicotine or placebo gum, nicotine served as a reinforcer; i.e., subjects consistently self-administered nicotine gum but not placebo gum. Subjects discriminated between the gums on the basis of side-effects; thus, ability of nicotine to serve as a reinforcer may not have been the result of its psychoactive effects, but rather because subjects believed that the gum with more side effects was the active gum. In study 2, an attempt was made to change this belief by telling subjects they would receive either marketed nicotine gum or an equally effective new gum with fewer side-effects (i.e. placebo). In study 3, subjects were told that the placebo gum had more side effects than the nicotine gum. With these two instructional sets, the stimulus properties of nicotine did not serve as a reinforcer; i.e., subjects self-administered equal amounts of nicotine and placebo gums, demonstrating that instructions can control a drug as a reinforcer. (Auth. Abs. Mod.)

86–0609. Kamarck, T.W.; Lichtenstein, E. **Current Trends in Clinic-Based Smoking Control.** *Annals of Behavioral Medicine* 7(2):19-23, 1985.

Although the average smoking treatment participant faces rather modest prospects for long-term success, there has been progress in development of effective treatment strategies. Multicomponent aversive/self-management packages have produced the most consistent success rate, and a dismantling study comparing programs with various treatment components would be useful in specifying the active ingredients of such packages. Alternatives to rapid smoking (e.g., smoke holding) are also needed to permit more widespread use of aversive procedures. Nicotine gum appears to produce consistent positive results compared with placebos, and seems especially promising for clinic treatments. The most effective ways to combine nicotine gum use with behavioral treatments should be explored and more research is needed in the area of relapse prevention. Coping skills training and commitment enhancement may hold some promise, and social support intervention shows some potential as a maintenance procedure. Treatment outcome research is timely, but studies that investigate the process of quitting and relapse are also important. A better understanding of determinants of success in becoming an ex-smoker should contribute to progress in modification of cigarette dependence. (Auth. Abs. Mod.)

86–0610. Lando, H.A.; McGovern, P.G. **Nicotine Fading as a Nonaversive Alternative in a Broad-Spectrum Treatment for Eliminating Smoking.** *Addictive Behavior* 10:153-161, 1985.

Effectiveness of nicotine fading as a nonaversive alternative to oversmoking was assessed in a comprehensive treatment program involving 66 women and 64 men (average age, 37.9 years; average consumption, 30.1 cigarettes/day for 19.7 years). During nicotine fading, smokers systematically switch to cigarettes containing progressively lower amounts of nicotine. Subjects were randomly assigned to oversmoking, nicotine fading, nicotine fading/smoke holding, and a nonmaintenance control. Results failed to indicate the expected superiority of nicotine fading/maintenance over the control condition, but addition of smoke holding appeared to produce a significant incremental effect over nicotine fading alone. The combination of nicotine fading/smoke holding produced a 44 percent abstinence rate at 12-month followup. It is suggested that if current results can be replicated, nicotine fading/smoke holding is encouraging as a clinically effective technique with applicability in both clinic and self-help settings. (Auth. Abs. Mod.)

86–0611. Ockene, J.K.; Camic, P.M. **Public Health Approaches to Cigarette Smoking Cessation.** *Annals of Behavioral Medicine* 7(2):14-18, 1985.

Public health strategies to facilitate and maintain smoking cessation, including those used in community trials, physician practices, worksites, and self-help methods are described. Community trials have demonstrated that the media is an effective tool for creating an atmosphere for change, but that successful change occurs only when (1) a large variety of approaches are available in a community on many different levels, (2) interpersonal and intensive approaches are included, and (3) members of the community are involved in development and delivery of intervention programs. Physician-delivered interventions can potentially affect a large segment of smokers, and worksite programs have been supported by management to reduce health care costs. Self-help strategies may be the most cost-effective approach, but results from self-help interventions vary widely. Although more data is needed, it appears that face-to-face interpersonal interaction is an important program element for many smokers. An integrated approach (a variety of techniques in many different settings within the smoker's natural environment) seems to hold the best promise for reducing the number of smokers in the United States.

86–0612. Rose, J.E.; Herskovic, J.E.; Trilling, Y., et al. **Transdermal Nicotine Reduces Cigarette Craving and Nicotine Preference.** *Clinical Pharmacology and Therapeutics* 38(4):450-456, October 1985.

Nicotine administered transdermally in 10 cigarette smokers reduced cigarette craving with relatively few adverse side effects. Either 8 mg nicotine base in a 30 percent aqueous solution or an inactive placebo solution was applied to intact skin under a polyethylene patch in a within-subjects, double-blind study. Smokers averaged 29±10.8 cigarettes/day with a mean nicotine delivery of 0.9±0.2 mg. Subjective reports of cigarette craving were collected every 30 minutes during a 90-minute period of abstinence. Immediately before and after abstinence periods, subjects smoked through a smoke-mixing device that allowed selection of desired nicotine intake with each puff. Transdermal nicotine significantly increased saliva nicotine levels within 30 minutes after application. Cigarette craving was significantly lower in the nicotine condition than in the placebo condition. Nicotine preference during the initial puffs of the smoke mixer test following 90 minutes of deprivation was also decreased by transdermal nicotine. In contrast, measures of cumulative smoke intake were not affected by the nicotine dose used. Results suggest the technique may be preferable to others in preventing cigarette craving usually observed after smoking cessation. (Auth. Abs. Mod.)

86–0613. Ryde, D. **Smoking and Hypnosis. (Letter).** *Practitioner* 229(1405):603-604, July 1985.

A response to a concurrently published letter (*Practitioner* 229(1405):603, July 1985) agrees that the success of hypnotherapy in smoking cessation depends on the patient's motivation. However, the Freudian implications of smoking are not considered relevant. It is suggested instead that nicotine withdrawal symptoms, which vary in degree from patient to patient, resemble those of anxiety states. Thus nicotine withdrawal may be a self-induced anxiety state caused by trying too hard to stop smoking. Tobacco itself is not an anxiolytic; smokers did not need a cigarette to calm them before taking up the habit. This could account for the inconsistent results with nicotine gum and the variations in withdrawal symptoms among abstaining smokers. It is also noted that the use of willpower is futile. Defined as the ability to determine one's actions against an opponent, willpower directed against one's self is counterproductive. Thus some smokers who try to quit end up smoking more. It is concluded that cessation of smoking requires appropriate motivation and a decision to quit that has been made calmly and not under self-imposed duress. See also 85-0607.

86–0614. Shiffman, S. **Cognitive Antecedents and Sequelae of Smoking Relapse Crises.** *Journal of Applied Social Psychology* 14(3):296-309, 1984.

Relapse, the greatest problem in smoking cessation, is explored by comparing Marlatt's account of cognitions surrounding relapse episodes against data collected from hotline interviews with 143 ex-smokers soon after a relapse episode. Callers were divided into recidivists and survivors, based on abstinence status, and coping responses were classified as either behavioral (e.g., eating) or cognitive (e.g., thinking about health consequences of smoking). Most subjects (especially recidivists) had expected that smoking would reduce tension. Subjects motivated by reduction of craving were unlikely to smoke. Contrary to expectations, all subjects experienced a significant decline in self-efficacy as a result of a relapse crisis, regardless of whether or not they had smoked. Survivors worried about future crises, while recidivists felt guilty about the transgression. Both groups reported feelings of failure that were related to inability to cope. The unexpected results, although from a limited sample, suggest that many subjects' experience of relapse and near-relapse are not well described by the Marlatt theory. (Auth. Abs. Mod.)

86–0615. Shiffman, S.; Read, L.; Jarvik, M.E. **Smoking Relapse Situations: A Preliminary Typology.** *International Journal of the Addictions* 20(2):311-318, February 1985.

A preliminary attempt to develop a typology of smoking relapse episodes based on cluster analysis is described. Descriptions of relapse or near relapse episodes were collected from 183 ex-smokers who called a telephone hotline seeking help in staying abstinent. The clustering process eliminated 81 cases (missing information); 49 cases could not be placed into a distinguishable cluster. The remaining 53 cases were classified into two higher-order clusters distinguished by (1) positive affect situations in which self-indulgence is prominent, and (2) negative affect situations that are characterized by high levels of stress and by anxiety and depression. The two groups were further divided into five clusters characterized by the following relapse situations: (1) drinking alcohol with others who are smoking (type 1a); (2) relaxing at home with strong cravings and feelings of deprivation and self-indulgence (type 1b); (3) episodes of strong craving in unstressful situations (type 1c); (4) work stress accompanied by anxiety and/or anger (type 2a); and (5) inactive and bored with low stress level, usually associated with withdrawal (type 2b). Type 1a situations were associated with less behavioral coping and more relapse than the other types.

86–0616. Turner, S.A.; Daniels, J.L.; Hollandsworth, J.G. **The Effects of a Multicomponent Smoking Cessation Program With Chronic Obstructive Pulmonary Disease Outpatients.** *Addictive Behaviors* 10(1):87-90, 1985.

The long-term effects of a nonaversive multicomponent smoking cessation program consisting of brand fading and stimulus control were examined by self-report in a group of four chronic obstructive pulmonary disease outpatients. Brand fading required reductions in daily nicotine levels of 30, 60, and 90 percent, respectively, during weeks 2, 3, and 4; week 5 was the target date for smoking cessation. Stimulus control involved gradual reduction in the number of places where the individual smoked, starting with the places of least importance and ending with places of most importance. Confirmation of self-reports on smoking status was through observations of collaborators and serum thiocyanate analyses. A multiple baseline design across subjects was utilized for visual analysis of treatment effects. At 3- and 6-month followup, one subject had quit smoking and two subjects continued smoking but had reduced smoking frequency and nicotine intake (by brand fading). The fourth subject had returned to the original cigarette brand, but had reduced smoking frequency.

86–0617. West, R.J.; Jarvis, M.J.; Russell, M.A.H., et al. **Plasma Nicotine Concentrations From Repeated Doses of Nasal Nicotine Solution.** *British Journal of Addiction* 79:443-445, 1984.

Nasal nicotine solution (NNS) may be more effective than nicotine chewing gum as an aid for smoking cessation; plasma nicotine levels are higher and absorption more rapid with NNS. Following eight hourly administrations of 2 mg NNS, peak plasma nicotine concentrations rose to an average of 16.3 ng/mL, higher than is normally obtained from 2 mg nicotine chewing gum. Average increment 7.5 minutes after each dose was 5.4 ng/mL. However, considerable variability was obtained with NNS. One subject reached a peak of 33.3 ng/mL (similar to heavy cigarette smoking), while the level in another was only 10.6 ng/mL. Average increment/dose varied between 1.3 and 13.2 ng/mL. A large amount of within-subject variation also occurred. Initial doses produced noticeable lightheadedness in four of five subjects. Because of considerable variability across and within individuals, more efficient administration techniques will be needed before maximum benefits from NNS can be obtained. (Auth. Abs. Mod.)

86–0618. Windsor, R.A.; Cutter, G.; Morris, J., et al. **The Effectiveness of Smoking Cessation Methods for Smokers in Public Health Maternity Clinics: A Randomized Trial.** *American Journal of Public Health* 75(12):1389-1392, December 1985.

Two different smoking cessation methods evaluated in public maternity clinics indicated that health education tailored to the pregnant smoker is more effective in changing smoking behavior. The 309 pregnant women from three public clinics were randomly assigned to one of three groups. Group one served as controls; those in group 2 received the American Lung Association's *Freedom From Smoking Manual*; and those in group 3 received *A Pregnant Woman's Self-Help Guide to Quit Smoking*. Saliva thiocyanate (SCN) and self-reports at midpregnancy and end of pregnancy were used to confirm cessation or reduction. In the control group, 2 percent quit and 7 percent reduced SCN levels. Among women assigned to the ALA method, 6 percent quit and 14 percent reduced SCN levels substantially. Of those who used the guide, 14 percent quit and 17 percent reduced SCN levels substantially. An examination of characteristics of those who quit revealed that age, education, and race were not predictors of cessation. However, pregnant smokers who quit had entered prenatal care an average of 1 month earlier than pregnant smokers who did not quit (2.8 vs. 3.8). Of the 22 quitters, 12 were light smokers (1 to 9 cigarettes/day); 5 smoked 10 to 19 cigarettes/day; and 5 smoked >20 cigarettes/day at initial prenatal visit. Results indicate that tailoring health education to the pregnant smoker is more successful than standard clinic information and advice to quit or use of untailored smoking cessation methods. (Auth. Abs. Mod.)

TOBACCO PRODUCT ADDITIVES

86–0619. Gregory, S.T **Smoking Appliance.** United States Patent No. 4,549,558, October 29, 1985, 4 pp.

The compact smoking appliance described resembles a pipe. It is equipped with a filter-holding chamber for easy insertion and removal of filters. The device uses filters with improved tar and nicotine traps to reduce amounts of toxic substances. The filter is chemically treated to further reduce the bite normally associated with smoking and particularly with pipe smoking. The appliance is described in detail, with illustrations. (Auth. Abs. Mod.)

86–0620. Sensabaugh, A.J., Jr.; Crepps, D.C.; Rice, W.Y., Jr., et al. **Tobacco Product.** United States Patent No. 4,545,392, October 8, 1985, 8 pp.

A smokeless tobacco product is described that contains cut tobacco treated with a particulated gum composition that adheres as a discontinuous coating to the surface of tobacco. The gum provides improved "gathering" characteristics and other advantages when the product is chewed. Gum compositions can also serve as carriers for flavorants. The gum base is a nonsaccharide, water-insoluble and masticable, and formulated from natural plant gums and/or synthetic materials. The formula may also include antioxidants, coloring agents, and other modifiers incorporated to control the physical characteristics of the gum base. (Auth. Abs. Mod.)

TOBACCO MANUFACTURING AND PROCESSING

86–0621. Cantrell, D.V.; Johnson, R.R. **Filtered Cigarette.** United States Patent No. 4,542,754, September 24, 1985, 6 pp.

The cigarette mouthpiece described reduces the tar content of mainstream smoke by ventilation with ambient air or in conjunction with gas separation. The mouthpiece has a hollow tubular section located between the tobacco column and the filter. The wall of the section is impermeable. Numerous grooves formed in the periphery extend longitudinally and open at the filter rod end. The section also has interior webs that span transversely across the section defining smoke channels that extend the length of the section and open at both ends. An air-permeable tipping paper, wrapped around the filter rod and tubular section, partially overlaps a portion of the tobacco rod. During smoking, unfiltered smoke passes through the interior channels of the tubular section to the filter. At the same time, ambient ventilating air is drawn into the peripheral grooves and passes into the filter where it mixes with the tobacco smoke.

86–0622. De la Burde, R.Z.; Aument, P.E. **Expanding Tobacco.** United States Patent No. Re. 32,013, October 29, 1985, 11 pp.

The process described for expanding tobacco uses liquid carbon dioxide as the expansion agent. Tobacco is thoroughly impregnated with liquid carbon dioxide, under pressure to retain its liquid form and maintained at a temperature no lower than -2°C. After the impregnation period, excess carbon dioxide is removed and the pressure is reduced to solidify carbon dioxide within the tobacco structure. The resulting product is then subjected to rapid heating at atmospheric pressure to vaporize solid carbon dioxide, thereby expanding the tobacco. The processing apparatus is described and illustrated. (Auth. Abs. Mod.)

86–0623. Johnson, R.R. **Cigarette Filter.** United States Patent No. 4,545,391, Octob- 8, 1985, 4 pp.

A cigarette filter that lowers tar consumption and enhances cigarette flavor is described. The filter is composed of a smoke-impermeable cylindrical core that is at least partially overlayed at the periphery with a smoke-permeable material, which is circumscribed by a perforated tipping material to form a cigarette filter. The filter provides a pressure drop to reproduce the draw effort of a conventional cigarette, and lowers tar predominantly by ventilation. By dispensing the flow of smoke peripherally, the filter also enhances cigarette flavor. (Auth. Abs. Mod.)

86–0624. Lephardt, J.O. **Cigarette Having a Corrugated Wrapper.** United States Patent No. 4,553,556 November 19, 1985, 8 pp.

A cigarette design featuring corrugated wrapping for firmness and rigidity is described. The corrugated wrapper is constructed so that the outer and inner surfaces are separated by a distance less than the minimum transverse dimension of the tobacco rod. Incorporated in a cigarette, the corrugated wrapper provides firmness and rigidity independent of density of smoking material. Corrugated wrappers can be made of low weight conventional cigarette paper or similar sheet materials, or can be a combination of thin, flexible inner and outer layers of sheet material with an in-between layer of corrugated sheet material. In another mode, the tobacco rod can be replaced by an unwrapped extruded rod of smoking material or by any other desired smoking material. (Auth. Abs. Mod.)

86–0625. Maeda, K. **The Design of Ventilated Filter Cigarettes.** *Tabak Journal International* 3:228-229, 232-233, June 1985.

The evolution of cigarette filtration is described with a review of current technologies. Four basic methods have been employed for removing harmful constituents from cigarette smoke: filtration, adsorption, dilution, and diffusion. The permeability of the cigarette paper influences the number of puffs, burning rate, and smoke yields by diluting mainstream smoke as it is drawn along the tobacco rod. Permeability may be controlled by the amount of calcium carbonate incorporated, by the degree to which the paper fiber is beaten, or by perforation. Ventilated filters have reversed the trend toward use of highly permeable cigarette paper. Filter ventilation is achieved by using a porous plug wrap and perforated tipping paper, the degree of ventilation being controlled by the properties of the two components. Plug wrap permeability has been increased by nonweaving techniques using longer fibers; tipping porosity has been controlled by altering the band width, the number of perforations, and perforation size. The relationship between pressure drop and ventilation rate is manipulated through choices of cigarette paper and filter. Tipping paper with many small holes provides a higher level of ventilation and lower pressure drop than paper with a few large holes. Through altered pyrolysis and decreased flow rate, advances in air dilution have provided reductions in cigarette yield while maintaining enhanced smoke taste.

86–0626. Riehl, T.F., Jr. **Mouthpiece for a Cigarette and a Cigarette Having Same.** United States Patent No. 4,550,740, November 5, 1985, 8 pp.

The cigarette mouthpiece described, which lowers tar by ventilation while enhancing the perceived taste of a cigarette, contains an air-impermeable core of less than tobacco-column diameter attached to a hollow sleeve of tobacco-column diameter. By positioning the hollow sleeve over the air-impermeable core, open annular channels are formed. The mouthpiece, connected to the tobacco column by tipping material, includes a filter plug designed with longitudinal grooves. The air- and smoke-impermeable core is placed coaxially to the filter plug opposite the tobacco column and a cylindrical sleeve of the same diameter as the filter plug is positioned over the core, thereby forming annular channels open at each end. When the smoker draws on the mouthpiece, undiluted and unfiltered smoke is drawn from the tobacco column into the smoke chamber and through the outlet into the smoker's mouth. At the same time, ventilation air is drawn in through the tipping paper and longitudinal grooves to mix with the undiluted smoke within the smoker's mouth. (Auth. Abs. Mod.)

86–0627. Selke, W.A.; Cartwright, W.F. **Dry-Forming of Reconstituted Tobacco and Resulting Product.** United States Patent No. 4,542,755, September 24, 1985, 10 pp.

A method for making reconstituted tobacco using a dry-forming process is described. Fiberized tobacco stems, lamina, and fines are initially entrained in a gas medium, deposited on a moving foraminous carrier, and adhesively bonded into sheet material, which is then dried if necessary. The dried sheet may then be divided into leaflets or shredded for further processing. In a preferred embodiment, woodpulp cellulose or other natural fibers are added to the fiberized stems and processed with other tobacco material to provide a bonded sheet with increased strength. The procedure avoids the need to add moisture, thereby reducing costs. More natural taste and aroma are retained in cigarettes manufactured from tobacco produced by this method, which eliminates the need to evaporate large amounts of water, with the attendant steam distillation of tobacco aroma volatiles.

86–0628. Sykes, L.M.; Snow, R.G.; De la Burde, R.Z., et al. **Process for Expanding Tobacco.** United States Patent No. Re. 32,014, October 29, 1985, 8 pp.

Improvements to the carbon dioxide method for tobacco expansion is described. Modifications to the basic process include (1) controlling moisture content of tobacco during the first step of the process; (2) draining off excess liquid carbon dioxide under controlled conditions between the first and second steps of the process; and (3) improving control of output moisture of the product during the third step of the process. (Auth. Abs. Mod.)

TOBACCO ECONOMICS

86–0629. Ahmad, S.M. **A Crash Programme of Renovation for China's Cigarette Industry.** *Tabak Journal International* 3:179-180, June 1985.

Recent renovation and modernization of China's cigarette industry were accompanied by a policy of neither encouragement nor strong discouragement of smoking. No health warnings are found on cigarettes and advertising is nonexistent.

Some steps have been taken to educate the public about the health risks of smoking, but increasing affluence and a relatively young population are reflected in increasing sales. Schoolchildren are not allowed to smoke and nonsmoking areas are often found. Chinese smokers generally prefer Virginia flue-cured and British-type cigarettes; however, demand for American-blend cigarettes is increasing. Although most cigarettes are still nonfilter (90 percent), demand for filter-tipped cigarettes is increasing. Currently, 2,500 brands are produced by 140 plants, following the closing of over 200 small, uneconomical manufacturing plants. The process of balancing and modernizing the industry continues with more factory closures expected. The Chinese Government does not allow foreign cigarettes to be marketed to the general population and export of Chinese cigarettes is still limited.

86-0630. Ahmad, S.M. **Good Prospects for the Pakistan Tobacco Industry.** *Tabak Journal International* 4:286,288-289,292, August 1985.

Six major tobacco companies control 99 percent of the Pakistani market. However, owing to a substandard 1984 crop that caused large losses, only 5 of the 25 cigarette manufacturing companies in Pakistan remained partially or fully operative. A total of 40.6 thousand million cigarettes were produced, an increase of 5.0 percent over 1983 levels. Of the 20 leading cigarette brands, 15 are medium tar and 5 are high tar and 12 are filter tipped. It is noted that the filtered market segment increased 12 percent from 1983 to 1984 and now represents 60.3 percent of total sales. Of 12 new brands launched in 1983, only two were unfiltered. Exports increased in 1984 by 46 percent, an all-time record. Problems faced by the Pakistani tobacco industry, such as the excise duty structure, official policies encouraging "biri" cottage industry, pretax profits, and inflationary effects, are discussed.

86-0631. Amblard, P.; Nychas, A. **Organization of the Tobacco Market in the European Community.** *Tobacco International* 187(15):7-8,10, July 1985.

Free cultivation of tobacco within the European community was instituted in 1970, liberating the market from monopolistic control of production, prices, and sales. Within the framework of the Common Agricultural Policy (CAP, created in 1960), the tobacco market is organized around a system of prices and support measures that maintain and ensure the sale of tobacco at profitable prices. Thus the CAP framework, which includes direct subsidies, is essentially a deficiency payment system. The pricing structure (norm, intervention, and derived intervention prices) and support measures of the CAP system (premium, export refunds, and cultivation contracts) are described. Control of the market is achieved through a series of restrictive measures aimed at bringing offer and demand into equilibrium, reducing existing stocks, and orienting production toward desirable varieties or types of tobacco. The Advisory Committee on Raw Tobacco provides the Tobacco Division with information and advice on all aspects of tobacco production and utilization. Decisions are made by the Management Committee on Raw Tobacco, composed of representatives from each member country.

86-0632. Brawley, R.L. **A Pack Is Not a "Pack" Is Not a Pack. (Letter).** *Journal of the American Medical Association* 254(18):2556-2557, November 1985.

The new tobacco industry marketing concept of 25 cigarettes/pack instead of the traditional 20 is disturbing. Smokers who continue to smoke a pack/day will be increasing consumption by 25 percent. The marketing ploy of convenience (for smokers who prefer the convenience of five more cigarettes/pack) appears to be an obvious attempt to increase per capita consumption and sales of cigarettes. In fact, one tobacco company, in introducing nationwide distribution of the new size pack, predicts annual sales of more than 185 million dollars and more than 1 percent of all cigarette sales. Since many adverse health effects of smoking are dose related, increased consumption and the theoretical increase in cigarette-related diseases are negatives for the new pack size. It is also noted that if the new pack is accepted by the consumer and widely marketed, smoking risk will have to be calculated in terms of both old pack-years and new pack-years.

86-0633. Finland, Advisory Committee on Health Education. **An Evaluation of the Effects of an Increase in the Price of Tobacco and a Proposal for the Tobacco Price Policy.** Finland, National Board of Health, Health Education, Series Statistics and Reviews 7/1985, Helsinki, March 1985, 32 pp.

An increase in prices for tobacco products (to reduce future tobacco consumption by 3.4 percent annually) has been recommended by Finnish health authorities to reduce tobacco-related disease and mortality while maintaining revenues and tobacco industry profits. If consumption can be controlled, it is estimated that 1,350 lung cancer deaths will be prevented between 1990 and 2006. If only 2 to 3 percent of smokers aged 35 to 64 years quit each year, 150 tobacco-related deaths will be prevented; a 4 percent reduction would save 260 lives. The tobacco price policy recommended for 1985 to 1987 is designed with flexibility to implement other price and tax policy measures in the interest of public health, e.g., reducing prices of basic foodstuffs should tobacco price increases cause inflationary pressures (tobacco prices are included in the consumer price index). A 3 percent reduction in total consumption of tobacco products during the current year will require a 17 percent increase in the retail price of tobacco products.

86-0634. Institute for the Study of Smoking Behavior and Policy. **The Cigarette Excise Tax** ***April 17, 1985.*** Smoking Behavior and Policy Conference Series, Harvard University, John F. Kennedy School of Government, Institute for the Study of Smoking Behavior and Policy, Cambridge, Massachusetts, April 17, 1985, 123 pp.

The first report from a series of conferences that will examine conceptual, analytical, and practical linkages between smoking behavior research and public policy is presented. The conference was not convened to promote an increase, reduction, or maintenance of the current cigarette tax. Rather, it analyzed the best available data to help decisionmakers involved in the issues under study. Papers on the following topics are included: (1) the economic, policy, and enforcement considerations in the taxation of cigarettes; (2) impact on consumption of a change in taxation levels; and (3) the fairness of cigarette excise taxation. Conference discussions touched on a wide variety of factors involved in cigarette tax issues, including bootlegging and smuggling, old vs. young smokers, rich vs. poor smokers, legislative earmarking, military practices, compensatory smoking, the underreporting factor, consumption pattern effects in men vs. women, health implications, whether or not people will quit, and regressivity.

86–0635. Jentsch, P. **In Germany 1984, Established Brands Gain, Consumption Up.** *Tobacco International* 187(15):24, July 26, 1985.

The disturbances and structural changes that occurred in the German cigarette market in 1983 appeared to consolidate in 1984. Cigarette prices remained stable throughout the year with domestic sales of manufactured cigarettes increasing to 117.7 billion pieces (83.5 percent of cigarettes consumed), representing an increase of about 5.7 percent over 1983 sales. The market share of classical brands increased to 84.5 percent (from 77.3 percent in 1983) while cheaper dealers' own brands (DOBs) decreased from 5.3 to 4.1 percent. The newly created low-price segment decreased from 17.5 percent in 1983 to 11.4 percent in 1984. Cigarette production in 1984 increased by 1.3 percent to 160.6 billion pieces, of which about 44.3 billion pieces were exported. The 18 million German smokers consumed about 141 billion cigarettes, an increase of 2.2 percent over 1983. In addition to factory-made cigarettes, 7.6 billion (5.4 percent) were from border sales and 15.7 billion (11.1 percent) were roll-your-own. Statistics from the first half of 1985 indicate that the industry has still not recovered from 1983; however, domestic sales are up by 2.1 percent, with classical brands increasing to 86.4 percent and DOBs decreasing to 3.7 percent.

86–0636. Jungbluth, G. **Good-Sized Brazilian Crop; Cigarette Sales Still Declining.** *Tobacco International* 187(13):5-6, 8, 10, June 28, 1985.

For the third consecutive year, the size of the tobacco crop in Brazil for the 1984 to 1985 growing season appears to be good; however, a continuing decline in cigarette sales and tobacco exports have combined to cause much concern among cigarette companies and tobacco growers. It is estimated that the crop will be 312,000 tons in South Brazil: Virginia 224,000 tons, burley 43,500 tons, Amarelinho 26,500 tons, and Galpao Comum 18,000 tons (172,000 tons for domestic consumption and the remaining 140,000 tons for exportation). Domestic cigarette sales have been declining since 1980 as a result of high prices caused by high taxation and decreases in consumer buying. The Brazilian smoker currently ranks tenth in the world, with per capita consumption of 1,590 cigarettes/year. As a result, tobacco companies have been forced to increase exports; however, foreign buyers are already purchasing all the tobacco they need. If domestic sales continue to decline, tobacco production will have to be reduced, a move that will have a tremendous impact on all growers.

86–0637. Maxwell, J.C., Jr. **How the Brands Ranked. Maxwell International Estimates.** *World Tobacco* 90:41, 43, 45, 47, September 1985.

Data on cigarette brand market shares are presented for 27 countries. Statistics are given for the (1) proportions of filtered and nonfiltered cigarettes sold; (2) market ranking for all major brands and types of cigarettes for 1982, 1983, and 1984; and (3) total sales in millions of pieces for the 3 years in each country. In the majority of countries, market shares for filtered cigarettes are increasing. In 19 of the 27 countries listed, filtered cigarettes now represent more than 90 percent of the total sold. The countries covered in this report are Australia, Austria, Belgium-Luxembourg, Great Britain, Cyprus, Denmark, Dominican Republic, Fiji, Finland, France, West Germany, Greece, Guatemala, Hong Kong, India, Ireland, Italy, Japan, Malaysia, Norway, Pakistan, Panama, Philippines, Poland, Singapore, Switzerland, and Uruguay.

86–0638. Misdorp, S. **Argentine Leaf Prices Burdened by Inflation; Cigarette Sales Soar.** *Tobacco International* 187(13):11-12, 14-16, June 28, 1985.

The 1984 to 1985 tobacco season in Argentina was characterized by two outstanding features: a substantial drop in production of green leaf, especially Virginia tobacco, and almost record cigarette sales. The 12.6 percent increase over the same period in 1983 resulted in the highest level of sales for the past 12 years: a total of 38.90 billion cigarettes. Increases show signs of continuing into 1985, with an increase of 2.4 percent already noted for the first 3 months of 1985 over the same period last year. The trend in cigarette preferences is toward international brands, especially American-type cigarettes, but the two best-selling cigarettes continue to be national brands. Decreases in tobacco production resulting from less area planted and a three-leaf reaping program are attributed to continually escalating input costs, tighter credit facilities, uncertain market conditions, and unsatisfactory prices. In one region (Jujuy) it is estimated that 20 percent of the tobacco farmers now grow beans as well as tobacco and the number is increasing annually. In addition, cigarette manufacturers are burdened by strict price controls and increased taxation.

86–0639. Rudolph, B. **Tobacco Takes a New Road.** *Time* pp. 70-71, November 1985.

Tobacco manufacturers are diversifying into other companies as product liability suits, decline in cigarette consumption, harsher health warnings on product packages, and smoking restrictions in offices and many restaurants are causing problems for industry executives. About 40 product liability suits are about to have their day in court, but cigarette companies, insisting that liability lawsuits have no bearing on corporate strategies, continue product promotion. New brands are being marketed, and some economy brands are becoming strong sellers. Generic cigarettes cost about 2 dollars less/carton than name brands and so-called value packs feature 25 cigarettes for the price of 20. Beneficial economic factors include a 10 percent drop in the price of the most commonly used tobacco leaf, and a willingness by cigarette consumers to pay higher prices. Cigarette industry operating earnings this year are expected to increase 15 percent over 1984, an impressive gain considering that revenues rose by just 6 percent. However, gains are not being shared equally; R.J. Reynolds and Philip Morris have been increasing sales at the expense of smaller firms (such as Lorillard and American Brands).

86–0640. Tabak Journal International. **Statistics. Cigarette Production in Selected Countries, 1975/79, 1980-1984.** *Tabak Journal International* 4:346-348, August 1985.

Asia led the world in cigarette production in 1984 with 1,995,755 million pieces. Europe (including Russia) took second place with 1,422,763. Mainland China, the largest single producer, reached a new high of 1,062,500. The United States, despite a continuing decline, remained the world's second largest with 668,200, followed by Russia (385,000) and Japan (306,000). Europe's major producers were the Federal Republic of Germany (160,630, up from previous years); United Kingdom (130,473, continuing to decline); Italy (80,435, unchanged from previous years); and Spain (75,100, a slight gain). Brazil led South American countries with 127,800, a decline from previous years but accounting for more than half of the continent's total production (235,784). Indonesia recorded a new high in production with 99,408, while India (85,028) increased production but was still below its 1982 peak. Other large Asian producers were Republic of Korea (77,971, a new high), Turkey (61,878, down from 1982), and the Philippines (58,562, steadily declining). Downward trends continued in Canada (61,634) and Mexico (48,490). Egypt reached a new peak at 48,000, and South Africa maintained production at 27,530.

86–0641. Tabak Journal International. **Development of the US Tobacco Market.** *Tabak Journal International* 4:298-300,302-304, August 1985.

Changing consumer tastes, health concerns, and demographic shifts point to further declines in U.S. tobacco consumption over the next 5 years. Total U.S. cigarette consumption in 1984 (approximately 587 thousand million cigarettes) was about 2.1 percent less than in 1983, when consumption declined by 5.4 percent. Sales of generic cigarettes, retailing for approximately 20 cents less than regular cigarettes, reached 18 thousand million, or a 300 percent increase over 1982 with volume about that of the sixth ranking brand. Some companies are offering 25 cigarettes for the price of 20. Demand for cigars also declined in 1984, but demand for snuff increased. Demand for cigarettes will likely decline further, and sales of cigars and other tobacco products, except for snuff, are expected to decrease as the male population ages and employment shifts from rural and industrial sectors to services. Analysts expect cigarette manufacturers to intensify the struggle for market share by means of price/product differentiation.

86–0642. Tobacco International. **SEITA Still Dominates French Market; Gauloises Blondes Soars.** *Tobacco International* 187(15):11-12,14,16,18-19,22, July 1985.

SEITA's tobacco sales in 1984 amounted to 30.5 billion francs, an increase of 1.3 percent in volume and 10 percent in value over 1983 figures. In volume, SEITA's 1984 sales of 56 billion tobacco units represented 61 percent of the total French market, despite labor problems that plagued manufacturing and distribution operations in November and December. SEITA's strategy in 1984 was geared toward defending dark tobacco cigarette sales and developing blond cigarette sales. In April, SEITA launched Gauloises Blondes to slow down growth in sales of imported blond cigarettes, and captured 17 percent of the market by selling 2.3 billion units in 9 months. Advertising and promotional efforts were focused on sports, promotion of major products at large attendance events, and emphasis on light products. Promotion of Gauloises Blondes is considered one of the greatest marketing successes of the past few years. For the year, export sales volume of SEITA brands reached approximately 11.2 billion units, representing a 1.3 percent decline from 1983 sales. In total, SEITA manufactured 65.9 billion units in 1984, or 3.5 percent less than in the preceding year.

86–0643. Tobacco International. **Brazil: Outlook Cautious for 1986 Tobacco Crop.** *Tobacco International* pp. 26-27, August 1985.

Loss of buying power caused by inflation (8 to 12 percent/month, 220 percent in 1984) is shrinking the tobacco market in Brazil as smokers are either giving up smoking or switching to cheaper brands. The market for roll-your-own and cornleaf cigarettes, estimated at 40,000 tons (almost 20 percent of flue-cured), is growing and evading the heavy tax charge that accounts for 75 percent of the consumer price for regular cigarettes. Because of high inflation and a huge foreign debt (largest in the world at 100 billion U.S. dollars), the Brazilian Government increased cigarette prices 40 percent. With margins being squeezed, tobacco companies are cutting production and closing down tobacco plants. The answer to the supply-and-demand conflict is to produce less tobacco in 1986 and to make an all-out effort to improve the quality of the crop to keep up with the competition (Zimbabwe, Argentina, and the

United States). However, Brazil's tobacco crop is grown by family-operated farms and constitutes the money crop for 140,000 farmers. Cutting back on production will be difficult for both farmer and exporter.

86–0644. Weiss, E.A. **Korean Tobacco Industry Under Pressure.** *Tabak Journal International* 3:174-175, June 1985.

The Republic of Korea (R.O.K.) is almost alone among major world cigarette markets in not allowing foreign investment in tobacco manufacturing or trade, which are all controlled by the Office of Monopoly. The situation (to protect local growers and manufacturers from "foreign domination") is the best method of ensuring high Government revenues from tobacco sales. Profits from the cigarette industry, 1.2 thousand million U.S. dollars annually, provide 9 percent of Government revenues. Total tobacco production has ranged between 90 and 115 thousand metric tons in the last 5 years. Approximately 60 percent is flue-cured, 30 percent is burley, and 10 percent is light sun-cured. In the R.O.K., the world's 13th largest cigarette market, domestic production increased from 70 million pieces (mp) in 1979 to 78 mp in 1984. Domestic consumption over this period rose from 50 to 60 percent of production to nearly 90 percent. The R.O.K., the sixth largest exporter of leaf, has a reputation for providing high quality tobacco; however, with prices 15 to 18 percent above market levels, it is losing its competitiveness.

86–0645. WHO Chronicle. **Tobacco—Its Role in the Economy and the Health of African Countries.** *WHO Chronicle* 39(3):104-106, 1985.

The smoking—health issue in Africa is complicated because many countries rely on tobacco for foreign exchange and Government revenues. Ministries of health and of agriculture often work at cross purposes. Such problems and the unscrupulous marketing practices of cigarette manufacturers pose a major threat to health. Smoking represents special risks to Africans because of the already high risk of bladder cancer from shistosomiasis and because 40 percent of women are anemic and have no reserve oxygen carrying capacity. Economic motives for smoking control include the costs of health care, availability of more land for food crops, and saving of resources used for leaf curing. It is noted that taxes only redistribute wealth, not create it. Recommended measures to control tobacco use are data collection, educating the public about the health hazards of smoking, prohibition of advertising, and warning labels. It is concluded that nothing can be accomplished immediately, and that Governments need encouragement to find alternative crops and revenue sources.

GENERAL

86–0646. Blackwood, M.J. **Health Risks of Smoking Increased by Exposure to Workplace Chemicals.** *Occupational Health and Safety* 54(2):23-27,81, February 1985.

Blue-collar workers have excess mortality from lung and other cancers and, statistically, higher smoking rates than the general population. Studies have suggested that some aerosols in the workplace combine differently with processes in the lung set off by smoking. Thickness of the mucus blanket in miners who smoke may actually protect the lung from ionizing radiation. However, once cancer invades the initially protected lung, the latency period is accelerated by as much as 9 years for smokers. When one contaminant facilitates the tumoragenic activity of another, as happens with smoking and asbestos exposure, the effects are synergistic. Smoking produced significant changes in the respiratory tract of welders, and ferric oxide (a common component of welding fumes) enhanced and promoted tumor activity of benzo(*a*)pyrene (found in cigarette smoke). Synergistic effects have also been found for radon daughters, grain dust, chlorine, cotton dust, coal dust, and beta radiation. Additive effects, i.e., exposure to substances in cigarette smoke and the same contaminants in the work environment, have been found with acetone, acrolein, aldehydes, arsenic, sulfide, ketones, nitrogen dioxide, phenols, and polyclyclic aromatic hydrocarbons. Transformative and vector effects and influence of drug use by smokers are discussed, as are other interactions, company costs created by smokers, and actions being taken by industries to address the problem.

86–0647. Cairns, J. **The Treatment of Diseases and the War Against Cancer.** *Scientific American* 253(5):51-59, November 1985.

Pouring hundreds of millions of dollars every year into providing chemotherapy for a growing number of cancer patients but doing virtually nothing to protect people from cigarettes is pure folly. By the 1960s cigarette smoking had been established as the major cause of lung cancer, but unfortunately, there are huge financial incentives for nations to sit back and do nothing. The cigarette, a readily taxable commodity, provides the Federal and state governments with about 6 billion dollars/year. More important (at least for the British Government, and perhaps for the U.S. Government), smoking reduces old-age benefits because it reduces a smoker's lifespan. At the price of a slight increase in costs for health care, each current smoker in the United States will save the U.S. Government 35 thousand dollars in Social Security payments. Most deaths occur after retirement from cardiovascular and chronic lung diseases, not from cancer. The loss of lifespan represents a total saving of some 10 billion dollars/year over the next half century or so. The conquest of the commonest of all lethal cancers depends on the will power of governments and not on the skill of physicians or the ingenuity of scientists.

86–0648. DeFrancesco, S.; McGuire, A. **The Fire-Safe Cigarette Campaign.** *Journal of Public Health Policy* 6(3):340-348, September 1985.

Fires caused by cigarettes kill approximately 2,000 persons annually, and burn and injure more than 5,000 more. In 1981, cigarette-related fires were the leading cause of residential fire deaths (27 percent) and accounted for 56 percent of deaths in hotels and motels. Fire-safe cigarettes are feasible. More than 100 patents for self-extinguishing, fire hazard-reducing, and fireproof cigarettes have been issued in the United States and in foreign countries. Cigarette makers purposely add citrate and phosphate compounds or calcium carbonate to cigarette wrapping peper to promote burning even when cigarettes are not smoked. The tobacco industry, which claims that a fire-safe cigarette is impossible to design, proposes that warnings to smokers, cigarette-proof furniture and bedding, and fire-resistant fabrics are the answer. The Cigarette Safety Act (1979, 1980) mandated the Consumer Product Safety Commission to develop a cigarette with minimum capacity for igniting furniture and mattresses without addition of toxic elements. Similar legislation was proposed in 11 states. The Cigarette Safety Act (1984) charged a committee with studying the technical and economic feasibility of a fire-safe cigarette and reporting its findings in 1987. Civil litigation, i.e., challenging the tobacco industry in court for unsafe cigarette design, is another approach to preventing cigarette-related fires. A manufacturer is liable if the court finds that defective product design created an unreasonable risk of injury to the consumer.

86–0649. Fielding, J.E. **Smoking: Health Effects and Control (Second of Two Parts).** *New England Journal of Medicine* 313(9):555-561, August 29, 1985.

This overview of the worldwide smoking problem includes discussions on the emergence and implications of low-yield cigarettes, smoking cessation methods, the role of health professionals in promoting nonsmoking, governmental and private sector measures designed to segregate smokers from nonsmokers, the influence of taxation on tobacco consumption, smoking prevention through health education directed at children and adolescents, smoking in the workplace, tobacco economics, smoking prevalence and trends in industrialized and developing countries, and future challenges for smoking control in the United States. It is noted that further progress toward reducing the prevalence of smoking is hampered by (1) the increasingly aggressive and well-financed efforts of tobacco companies to make smokers believe that smoking is a natural activity that causes no adverse health effects; (2) the addictive effects of nicotine; (3) the fact that most people who could easily give up smoking (i.e., lighter smokers) have already done so, leaving those who are most addicted still smoking; (4) the undercutting of public efforts to secure passage of laws providing for clean indoor air; (5) campaigns financed by the tobacco industry depicting smoking as an unalienable right; (6) inadequate training of health professionals in how to help smokers stop and how to prevent recidivism; and (7) uneven management support for strong corporate smoking policies that limit smoking and encourage cessation.

86–0650. Georgia Epidemiology Report. **What Does Smoking Cost Georgia?** *Georgia Epidemiology Report* 1(8):2-4, August 1985.

More than 6,350 deaths in Georgia in 1981 (14.1 percent of all deaths) were attributable to smoking, including almost 21 percent of cancer deaths and 37 percent of deaths from respiratory system diseases. With the possible exception of diet, smoking is the largest preventable contributor to cancer mortality, exceeding combined deaths from pollution, occupational exposure, and alcohol. Direct health care costs of smoking are estimated at over 342 million dollars. Assuming that indirect costs are 160 percent of direct costs, total costs of smoking in Georgia exceeded 890 million dollars in 1981. There were 700,185,361 packs of cigarettes sold in Georgia in 1981, generating (at 12 cents/pack) 84,022,243 million dollars in State revenues, in contrast with direct health care costs of 49 cents/pack and indirect health care costs of 78 cents/pack. Mortality data was calculated using methodology developed by the Minnesota Department of Health based on 24 different smoking-related diseases grouped into 6 diagnostic categories. (Auth. Abs. Mod.)

86–0651. Hornig, D.H.; Glatthaar, B.E. **Vitamin C and Smoking: Increased Requirement of Smokers.** *International Journal for Vitamin and Nutrition Research* 27(Supplement 2):139-155, 1985.

Smokers with vitamin C intakes comparable to nonsmokers have a substantially impaired vitamin C status, suggesting that smokers have an increased risk of marginal vitamin C deficiency if intake of vitamin C is reduced. Reasons for impaired vitamin C status in smokers (altered food intake, differences in absorption of vitamin C, or utilization of vitamin C as a detoxifying agent of smoke components) are discussed. Investigations with labeled vitamin C have shown that smokers have a significantly increased metabolic turnover compared with nonsmokers, and smokers excrete a higher amount of vitamin C in the form of metabolites. Evidence suggests that smokers also have a somewhat reduced absorption capacity for vitamin C, and thus require 40 percent more to maintain a comparable vitamin C status. A daily intake of 140 mg of vitamin C for smokers and 100 mg for nonsmokers is considered adequate to cover basic physiological requirements. Possible consequences of lowered vitamin C status on general health are discussed. (Auth. Abs. Mod.)

86–0652. Human Resources Policy Corporation. **Smoking Policies in Large Corporations.** Los Angeles, Human Resources Policy Corporation, 1985, 14 pp.

Responses (n=445) to an eight-page questionnaire, sent to *Fortune* 1,000 companies and *Inc.* magazine's 100 fastest growing companies, showed that less than one-third have a formal policy on smoking. Prevalence of smoking policies varied widely by industry: 57.1 percent of pharmaceutical companies have smoking policies compared with only 11.1 percent of mining/petroleum/refining industries. Most policies were instituted as safety measures around hazardous materials and had been in effect for >5 years. Few of the companies consider smoking behavior in hiring practices, and none claimed to refuse to hire smokers. The majority of companies (70 percent) encouraged employees to work out disagreements related to smoking among themselves. Most companies were willing to provide ventilation or rearrange work areas, but would not segregate workers or build partitions to separate smokers from nonsmokers. Most existing policies were implemented by management for safety reasons, without consideration of cost savings, profit increases, or employee morale.

86–0653. Last, J.M. **Controlling the Smoking Epidemic.** *American Journal of Preventive Medicine* 1(4):1-3, 1985

A powerful coalition of antismoking advocates (health organizations, physicians, parents, teachers, insurance companies, and others) is needed to combat the power and influence of the tobacco lobby. Tobacco is the only substance known to contain powerful carcinogens and to have serious adverse effects on health, against which consumers have no protection under the law. This is because tobacco has spawned a huge, lucrative industry that also enriches governments through taxes. A strategy for action outlined by the Office of Disease Prevention and Health Promotion, in the form of health objectives for 1990, includes (1) reducing the proportion of smokers to below 25 percent of adults and 6 percent of children and youth; (2) increasing public awareness of the health risks of smoking; (3) improving warning measures against tobacco hazards; (4) improving surveillance and evaluation of smoking control; and (5) enforcing smoking rules and regulations. The even stronger actions advocated by the World Health Organization include eliminating all advertising, restricting sales outlets, and impeding children's access to cigarettes. Other approaches include high taxes on tobacco to reduce sales and deter young people from starting to smoke, restricting smoking in public places, supporting nonsmokers' rights, and exposing fallacies in tobacco advertising. It will take combined strength to influence legislators to protect the health of all people against tobacco.

86–0654. National No Smoking Day Steering Committee, 1984. **How Effective Was National No Smoking Day, 1984?** *Health Education Journal* 44:59-65, 1985.

Up to 1.8 million smokers (13 percent) took part in National No Smoking Day 1984 in Great Britain by quitting, attempting to quit, or reducing consumption on that day. An estimated 500,000 reported smoking less 3 months later. Sponsored for the first time by a coalition of national organizations and with a budget of 50,000 British pounds, National No Smoking Day 1984 was designed to obtain maximum publicity for smoking and health and to encourage smokers to give up smoking, at least for the day. Followup research suggests that results could be improved by placing greater emphasis on helping smokers to give up, rather than on "antismoking." The day generated considerable publicity, stimulating at least 1,140 reports in the media; 13 each on national TV and radio. Organization and operation of the event, supporting local activities, and methods of sampling response are discussed. (Auth. Abs. Mod.)

86–0655. Roberts, K. **Let's Set the Record Straight.** *Delaware Medical Journal* 57(7):427-430, July 1985.

Despite overwhelming evidence relating ill health and smoking, the tobacco industry maintains that the association is still controversial. With the expenditure of 1.5 billion dollars annually, the tobacco industry has been extremely effective in offsetting the volumes of literature reiterating the ill effects of smoking. Furthermore, the Tobacco Institute claims that the tobacco industry is vital to the nation's economy: 2 million jobs, 30 billion dollars/year in wages and earnings, 15.5 billion dollars in capital investment, and 2.2 billion dollars in taxes. What they do not report is that more than 5 percent of the nation's total direct health care costs are for smoking-related diseases. In addition, the total annual loss of productivity secondary to excess morbidity, disability, and premature death amounts to 34 billion dollars. Physicians can combat the tobacco industry campaign by (1) not smoking; (2) placing "no smoking" signs in waiting rooms; (3) using magazines in waiting rooms that still carry cigarette ads to point out the contradictions they present; (4) having other informative materials available for patients; (5) encouraging patients to stop smoking and offering help; and (6) using a routine youth physical examination to educate patients about the ill effects of smoking and the enticing suggestions and associations presented by tobacco advertisements.

86–0656. Shopland, D.R.; Brown, C. **Area Review: Current Trends in Smoking Control. Changes in Cigarette Smoking Prevalence in the U.S.: 1955 to 1983.** *Annals of Behavioral Medicine* 7(2):5-8, 1985.

Smoking is at its lowest point since 1955, indicating increased rates of smoking cessation among adults and reduced rates of initiation among adolescents. Filtered cigarettes are smoked by more than 90 percent of smokers, and the sales weighted average of tar and nicotine in cigarettes has declined from 38 mg tar and 2.3 mg nicotine in 1954 to current levels that average 12 to 13 mg tar and 1 mg nicotine. The number of male smokers declined from an estimated 52.9 percent in 1964 to 35.2 percent in 1983. Among women, the proportion of smokers, which declined from a high of 34.1 percent in 1965 to 29.1 percent in 1983, still exceeds the 1955 percentage (24.5). Prevalence of cigarette smoking (> 1 cigarette/day in the past 30 days) among high school seniors reached its lowest point in 1984 (18.7 percent) from a peak in 1977 (28.8 percent). Annual per capita consumption has also dropped, from a peak in 1963 of 4,345/person (≥ 18 years of age) to 3,411/person in 1984. However, smokers are consuming more cigarettes/day. In 1980 and 1983, 34 percent of male smokers smoked ≥ 25 cigarettes/day compared with 24 percent in 1965. Percentages for women were 21 and 13, respectively. Although it has been reported that over 30 million smokers have quit since 1964, it is speculated that it is primarily "light" smokers who have been successful in terminating the habit.

86–0657. Vogt, T.M.; Schweitzer, S.O. **Medical Costs of Cigarette Smoking in a Health Maintenance Organization.** *American Journal of Epidemiology* 122(6):1060-1066, December 1985.

Medical care use by 2,582 smokers in a health maintenance organization showed that current smokers had 20 percent more hospital days/1,000 person-years of health plan membership (adjusted for age, sex, alcohol intake, duration of observation) than never smokers. Ex-smokers used more outpatient services than nonsmokers. Absolute differences for smoking-related diseases were generally about equal in magnitude to that expected from literature reports of morbidity ratios (e.g., total hospital days owing to ischemic heart disease were 2.7 times higher among current smokers than among never smokers). There was no discernible difference between current smokers and never smokers in outpatient utilization costs. Ex-smokers, however, had significantly higher rates of inpatient utilization for heart disease than nonsmokers, but not higher than those of current smokers. Outpatient utilization did not increase with an increase in number of cigarettes currently smoked; actual use of outpatient services was inversely related to the number of cigarettes smoked except by those below 25 years of age. Although smokers did report poorer health status than nonsmokers, there was no relation between reported health status and number of cigarettes smoked/day. At the time of interview (1970 to 1971) 34 percent were current smokers and 25 percent were former smokers. Subjects were 46 percent male, 84 percent married, 36 percent under 40 years of age, and 18 percent over 65 years of age. (Auth. Abs. Mod.)

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INTRODUCTION

All items appearing in the *Smoking and Health Bulletin* become part of the permanent document collection of the Technical Information Center (TIC) of the Office on Smoking and Health and can be referred to by their accession numbers.

In this issue of the *Bulletin*, we are introducing two new subject categories: **Passive Smoking** and **Smokeless Tobacco**. Inclusion as separate categories reflects the increasing body of scientific literature that addresses these topics. Previously, studies on these topics were catalogued in the *Bulletin* under one of the existing sections. For example, a study on snuff and its correlation with cancer of the oral cavity would have been included under Neoplastic Diseases.

Although the term "Passive Smoking" does not adequately describe the exposure (many scientists prefer "involuntary smoking" or "environmental tobacco smoke"), we will continue to use Passive Smoking for subject indexing and for comparability with previously processed abstracts. Abstracts appearing in the two new categories will be cross-referenced to other categories where appropriate. In the example used of snuff and oral cancer, a cross-reference to Neoplastic Diseases would be added.

In the past, at the end of each calendar year, it has been customary to publish the *Bibliography on Smoking and Health*, which contained a cumulative author and subject index based on the individual *Bulletins* issued that year. This year, however, it may not be possible to issue the index in the form of the annual *Bibliography*. All readers are therefore advised to retain the individual *Bulletin* issues for calendar year 1986 until further notice.

The TIC offers bibliographic search and retrieval services for information on smoking, tobacco, and tobacco use through its Automated Search and Retrieval System. Readers are encouraged to submit searches on the search request form found at the end of each issue of the Bulletin. Multiple copies of this form can be ordered from the TIC. Currently, the automated file contains approximately 52,000 records, the majority of which were published and processed into the TIC collection since 1970. The TIC collection totals more than 57,000 items.

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We welcome suggestions or comments from our readership regarding our publications and services.

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ISSN: 0081-0363
MAY-JUNE 1986
Abstacts 86-0658 - 86-0985

Smoking and Health Bulletin

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AGRICULTURE

86–0658. Wittekindt, W. **Changes in Recommended Plant Protecting Agents for Tobacco.** *Tabak Journal International* 5:390, 392-394, October 1985.

Changes in tobacco plant-protecting chemicals used in 22 countries exporting tobacco to the Federal Republic of Germany (FRG) from 1978 to 1985 are reviewed to facilitate monitoring and controlling chemical residues in imported tobacco and for establishing appropriate testing and analytical methods. Recommended maximum amounts of residues were established by the West German cigarette industry and manufacturers of plant protecting agents in cooperation with the West German Federal Health Office. Altogether, 129 agents were recommended in 1978 and 137 in 1985. Since 1978, 43 substances have been withdrawn and 53 have been added (35 were recommended for use in more than 5 countries, and 50 in 1 country only). While extensive information was obtained from 20 countries, data were less complete from Tanzania and Colombia and impossible to obtain from Poland, Malawi, and the People's Republic of China. The review of chemicals recommended for use includes insecticides, fungicides, nematicides, herbicides, stock-protecting agents, and growth regulation agents. Substitutions made in cases of developed resistance to indigenous harmful organisms are also documented. (Auth. Abs. Mod.)

CHEMISTRY

86–0659. Andersen, R.A.; Kemp, T.R. **Accumulation of 4-(*N*-Methyl-*N*-nitrosamino)-1-(3-pyridyl)-1-butanone in Alkaloid Genotypes of Burley Tobacco During Postharvest Processing: Comparisons With *N'*-Nitrosonornicotine and Probable Nitrosamine Precursors.** *Cancer Research* 45(11, Part 1):5287-5293, November 1985.

The concentration relationships of 4-(N-methyl-N-nitrosamino)-1-(3-pyridyl)-1-butanone (NNK), N'-nitrosonornicotine (NNN), and their probable precursors (nitrite, nitrate, and alkaloids) were determined (1) in Ky 14 burley tobacco grown under different shade conditions followed by air curing, and (2) during preparation of air-cured and homogenized-leaf-cured (HLC) burley tobaccos from conventionally grown tobaccos of different alkaloid genotypes. NNK levels ranged from 0.2 to 0.5 μg/g in air-cured Ky 14 tobacco, with the highest NNK concentrations from 45 percent shade-grown lamina from lower leaf positions on stalks. Concentrations of NNK did not correlate significantly with those of either nitrate or total alkaloids calculated over all shade treatments and stalk positions. During HLC processing, significant correlations of NNK with NNN ($r = 1.0$) and nitrate ($r = -0.9$) content changes were found for each of four burley alkaloid genotypes calculated over the four successive stages of processing. NNK also correlated negatively with nicotine concentration changes during processing ($r = -0.9$). After a 20-hour incubation period under aerobic conditions, followed by a 1-hour standing period without aeration, substantial increases of NNK were observed in each burley line. The increased NNK contents ranged from ninefold for the low-alkaloid isoline to 99-fold for the nornicotine-converter line. Increases in NNK content (27 to 69 percent) also occurred during air drying; further increases occurred during 15-month storage at ambient conditions. After HLC processing and prolonged storage, the following maximal NNK contents were observed: Ky 14 cultivar, 70 μg/g; low-alkaloid line, 80 μg/g; nornicotine converter line, 102 μg/g; and high-alkaloid line, 177 μg/g. Thus, NNK accumulation varied among tobacco alkaloid genotypes, with changes occurring mainly during the standing period following incubation, forced-air drying, and prolonged storage ("aging") for HLC tobaccos. (Auth. Abs. Mod.)

86–0660. Cosgrove, J.P.; Borish, E.T.; Church, D.F., et al. **The Metal-Mediated Formation of Hydroxyl Radical by Aqueous Extracts of Cigarette Tar.** *Biochemical and Biophysical Research Communications* 132(1):390-396, October 1985.

Aqueous extracts of cigarette tar produced hydroxyl radicals that were spin-trapped by 5,5-dimethyl-1-pyrroline-N-oxide. Addition of catalase almost completely inhibited and superoxide dismutase partially inhibited spin adduct formation. Addition of ethylenediaminetetra-acetic acid greatly increased the amount of hydroxyl radical adduct. In contrast, diethylenetriaminepenta-acetic acid caused complete inhibition of spin adduct formation. It is suggested that the hydroxyl radical arises from metal-mediated decomposition of hydrogen peroxide and that hydrogen peroxide is formed from reduction of dioxygen by semiquinones present in cigarette tar. Formation of active oxygen species by tar—oxygen reactions may be significant in smoking-related diseases. When tar is deposited in the lung matrix, active oxygen species may produce reactions with biomolecules leading to biological damage. (Auth. Abs. Mod.)

86–0661. Siddiqui, I.R.; Rosa, N. **Structural Investigation of Sodium Hydroxide-Soluble Tobacco** *(Nicotiana tabacum)*

CHEMISTRY

Polysaccharides: A Galactoxyloglucan. *Tobacco International* 187(17):42-43, August 23, 1985.

A galactoxyloglucan (amyloid) from tobacco leaf lamina was found to contain D-galactose, D-glucose, D-xylose, and D-mannose residues in molar proportions of 1:69:1:0.1. On methylation analysis, the polysaccharide yielded 2,3,4,6-tetra-O-methyl-D-glucose (6 mol), 2,3,4,6-tetra-O-methyl-D-galactose (1 mol), 3,4-di-O-methyl-D-xylose (3 mol), 2,3,6-tri-O-methyl-D-glucose (46 mol), and 2,3,-di-O-methyl-D-glucose (7 mol). Methylation analysis data show a statistical unit of 63 sugar residues consisting of 7 terminal nonreducing end groups (6-D-glucosyl and 1 D-galactosyl). There are seven residues of D-glucose involved in branching through positions 4 and 6. The remaining 49 nonterminal residues consist of 3 (1 through 2)-linked-D-xylosyl units and 46 (1 through 4)-linked D-glucosyl units. (Auth. Abs. Mod.)

See also, **86–0934**

PHARMACOLOGY AND TOXICOLOGY

86–0662. Ashby, J.; Richardson, C.R. **Tabulation and Assessment of 113 Human Surveillance Cytogenetic Studies Conducted Between 1965 and 1984.** *Mutation Research* 154(2):111-133, September 1985.

Data from 113 human surveillance cytogenetic studies conducted between 1965 and 1984 show that smoking generally leads to an increase in sister chromatid exchange (SCE) frequencies in human lymphocytes. Furthermore, smoking appears to be a key confounding factor in cytogenetic studies of suspected genotoxic chemicals. Smoking also apparently has an enhancing effect on the clastogenicity/SCE-inducing activity of some carcinogens, an effect that is consistent with current cancer epidemiology. Of the studies reviewed, 28 observed a clear positive effect of smoking on chemically induced chromosomal aberrations. Because it was determined that there is an urgent need for standardization of study protocols, it is suggested that a common method of reporting chromosomal aberrations be adopted, a minimum acceptable size of control and exposed populations be agreed upon, and potentially important factors such as gender, period and extent of exposure, and individual smoking habits be defined in advance. In addition, formation of a central repository for control databases is recommended. Minimal experimental criteria for the design of future studies are outlined. (Auth. Abs. Mod.)

86–0663. Baizer, L.; Weiner, N. **Nerve Growth Factor Treatment Enhances Nicotine-Stimulated Dopamine Release and Increases in Cyclic Adenosine 3':5'-Monophosphate Levels in PC12 Cell Cultures.** *Journal of Neuroscience* 5(5):1176-1179, May 1985.

Experiments involving cultures of clonal rat PC12 pheochromocytoma cells were undertaken to examine the relationship between nicotine-stimulated catecholamine release and increased cellular cyclic adenosine monophosphate (cAMP) levels in control and nerve growth factor (NGF)-treated PC12 cell cultures. Dopamine release in response to various concentrations of nicotine was maximal at 10^{-4} mol and decreased at higher concentrations. Nicotine stimulation of dopamine release was calcium dependent and blocked by *d*-tubocurarine, a specific nicotine cholinergic antagonist. Nicotine also caused increases in cAMP levels in PC12 cell cultures that were dependent upon and blocked by the same compounds. Cultures treated for 6 days or longer with 2 X 10^{-9} mol NGF released a threefold to fourfold greater amount of dopamine than cultures receiving maximal nicotine concentrations. Furthermore, nicotine caused a threefold greater increase in cAMP levels in NGF-treated cultures than in control cultures. The strong correlation between cAMP levels and dopamine release lends further support to the theory that cAMP is involved in the process of neurotransmitter release. (Auth. Abs. Mod.)

86–0664. Benowitz, N.L. **Pharmacokinetic Considerations in Understanding the Effects of Cigarette Smoking and Smoking Behavior.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 107-115.

Pharmacokinetics and pharmacodynamics of intravenous administration of nicotine and the effects of smoking were investigated to determine the (1) time course of nicotine in the body during daily smoking; (2) relationship between blood nicotine concentration and cardiovascular effects; (3) amount of nicotine consumed during daily smoking; and (4) extent to which nicotine intake is determined by smoking machine yields. Data from pharmacokinetic studies in 14 persons showed that there is considerable individual variability in the volume of distribution of nicotine, so that there is not a constant relationship between blood concentrations and total amount of nicotine in the body. Although overall clearance is high, terminal elimination of nicotine is relatively long and concentrations will remain at substantial levels for many hours. In studies with smokers, daily nicotine intake ranged from 10.5 to 78.6 mg in the 13 men and 9 women, who maintained a desired level of nicotine intake regardless of type or number of cigarettes smoked. However, most efficient smoking was observed with favorite brands. Heart rate during smoking followed a circadian pattern similar to that seen in abstinence, but was consistently higher and remained elevated even overnight (when subjects were not smoking), confirming that smokers are affected by nicotine 24 hours a day. Blood concentration of cotinine, measured in 272 persons entering a smoking cessation treatment program, was significantly correlated with number of cigarettes smoked/day, but not with FTC yields, determined by smoking machine. It was concluded that FTC machine yields of nicotine are poor predictors of nicotine intake by smokers, and that a smoker can obtain any level of nicotine desired from commercial cigarettes, regardless of nominal yield.

86–0665. Birgersson, C.; Blanck, A.; Woodhouse, K., et al. **Comparative Metabolism of Debrisoquine, 7-Ethoxyresorufin and Benzo(*a*)pyrene in Liver Microsomes From Humans, and From Rats Treated With Cytochrome P-450 Inducers.** *Acta Pharmacologica et Toxicologica* 57(2):117-120, August 1985.

Debrisoquine and benzo(*a*)pyrene (BaP) hydroxylation and 7-ethoxyresorufin O-deethylation were measured in 11 human liver samples. Metabolism of debrisoquine and 7-ethoxyresorufin were weakly but significantly correlated. In two samples, 7-ethoxyresorufin O-deethylation was competitively inhibited by debrisoquine. BaP hydroxylation, however, did not correlate with metabolism of the other two substances. In male rats treated with phenobarbitone (PB), isosafrole (ISF), and β-naphthoflavone (BNF), all three induced BaP hydroxylation. O-deethylation was induced by BNF and ISF, but only slightly by PB. Debrisoquine hydroxylation was unaffected by the inducers. It is suggested that more than one isozyme is responsible for the metabolism of these substances, and that they are influenced differently by inducing agents.

86–0666. Borland, C.; Harmes, K.; Cracknell, N., et al. **Methemoglobin Levels in Smokers and Non-Smokers.** *Archives of Environmental Health* 40(6):330-333, November-December 1985.

Methemoglobin (metHb) formation resulting from smoking did not appear to interfere with blood oxygen-carrying capacity in smokers, even though carboxyhemoglobin levels in smokers substantially exceed those in nonsmokers. Blood analyses were conducted on 336 smokers and 336 nonsmokers to study effects of tobacco smoke, potentially the major source of nitrogen oxide (NO) pollution for 40 percent of the adult population. Each blood sample was analyzed for carboxyhemoglobin, methemoglobin, and hemoglobin (Hb). Mean value of metHb was significantly higher in nonsmokers than in smokers. Although puzzling, this does not result from slightly higher Hb concentrations in smokers, since the difference is also seen if metHb concentrations rather than saturations are compared. It is unlikely that there was a significant difference in NO exposure from any other source or indeed any other cause of methemoglobinemia between the two groups. Number and brand smoked and time since last cigarette information was not obtained. (Auth. Abs. Mod.)

86–0667. Bridges, R.B.; Wyatt, R.J.; Rehm, S.R. **Effect of Smoking on Peripheral Blood Leukocytes and Serum Antiproteases.** *European Journal of Respiratory Diseases* 66(Supplement 139):24-33, 1985.

In a population of young smokers, changes in leukocyte count, neutrophil lysosomal enzyme activities, and functional serum antiprotease activity appeared to be consistent with the establishment of a protease—antiprotease imbalance that could predispose to obstructive lung disease. Changes in peripheral blood components were measured in 110 young male asymptomatic smokers and an equal number of age-matched nonsmokers. Modest but significant ($p=0.001$) impairment of pulmonary function was observed in smokers (measured by forced expiratory spirometry and single breath nitrogen test). A 35 percent increase ($p=0.0001$) in peripheral blood leukocytes in smokers was attributable to increases in neutrophils (44 percent), lymphocytes (31 percent), and monocytes (23 percent), which correlated significantly ($p \leq 0.01$) with some of the more sensitive indicators of airway obstruction. Myeloperoxidase activity of neutrophils isolated from peripheral blood of smokers was 13 percent higher than in nonsmokers, while elastase activity per neutrophil was apparently unaffected by smoking. In 50 subject pairs, elevations in serum α_1-proteinase inhibitor (α_1-PI) concentrations in smokers (13.7 percent) were comparable to similar increases in trypsin (9.9 percent) and elastase (12.4 percent) inhibitory capacities. Expressed as nmol protease inhibited/nmol α_1-PI, the functional activity of α_1-PI was unaltered by smoking. However, a lowered functional activity of α_1PI against trypsin and elastase was observed in both smokers and nonsmokers with higher serum α_1-PI concentrations. (Auth. Abs. Mod.)

86–0668. Bull, H.A.; Pittilo, R.M.; Blow, D.J., et al. **The Effects of Nicotine on PGI$_2$ Production by Rat Aortic Endothelium.** *Thrombosis and Haemostasis* 54(2):472-474, August 1985.

Single subcutaneous injections of nicotine at 1, 5, 10, or 20 mg/kg had no effect on prostacyclin production by rat aortic rings in a study to determine whether inhibition of vascular prostacyclin production following in vivo nicotine administration is an immediate effect or results from subacute exposure of the vessel to the compound. However, aortic rings obtained after 7 days' continuous subcutaneous infusion of 0.54 g/mL of nicotine (1 μL/hour) produced significantly less prostacyclin than rings from control animals. Results suggest that, in vivo, nicotine is not acting as an inhibitor of cyclo-oxygenase or any of the other enzymes involved in conversion of arachidonic acid to prostaglandin I_2. Based on preliminary measurements, the procedure may be a satisfactory method for studying in vivo nicotine effects over a prolonged time interval, since plasma and serum levels of nicotine considerably higher than those in human cigarette smokers were evident in 1 week. Further study is needed, however, to investigate the metabolism of nicotine administered over a prolonged period. (Auth. Abs. Mod.)

86–0669. Castonguay, A.; Foiles, P.G.; Trushin, N., et al. **Study of DNA Methylation by Tobacco-Specific *N*-Nitrosamines.** *Environmental Health Perspectives* 62:197-202, October 1985.

An enzyme-linked immunosorbent assay was developed to measure the O^6-methyl-2'-deoxyguanosine (O^6-MedGuo) produced in nasal mucosa, lung, liver, kidney, esophagus, spleen, and heart tissues of F344 rats treated with 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK). Four hours after a single intravenous injection of NNK (87 mg/kg body weight), O^6-MedGuo was present in target organs at levels of 219, 13.2, and 34.5 μmol/O^6-MedGuo/mol dGuo in nasal mucosa, lung, and liver, respectively, but was not detectable in nontarget organs. Following daily intraperitoneal injections of NNK (40 mg/kg body weight) for 14 days, levels of O^6-MedGuo/dGuo were 7.9 and 11.4 μmol/mol in nasal mucosa and lung, respectively. No O^6-MedGuo was detected in the liver, but 1050 μmol of 7-MeGua/mol Gua was detected. No DNA methylation was observed in nasal mucosa or liver of rats treated with *N'*-nitrosonornicotine. Following 1 hour in vitro culture of nasal mucosa with NNK or 4-(methylnitrosamino)-1-(3-pyridyl)-1-butan-1-ol (NNAI), methylation at the O^6-dGuo and 7-dGuo sites was observed with NNK but not with NNAI. Results suggest that NNAI is not associated with the activation of NNK to DNA methylating species. (Auth. Abs. Mod.)

86–0670. Clarke, P.B.S.; Hommer, D.W.; Pert, A., et al. **Electrophysiological Actions of Nicotine on Substantia Nigra Single Units.** *British Journal of Pharmacology* 85(4):827-835, August 1985.

Extracellular recordings of single unit activity were made in the substantia nigra (SN) of anesthetized rats to relate the differential distribution of putative nicotinic cholinoceptors within the SN with responses of nigral neurones to systematically administered nicotine. Dopaminergic neurons of the pars compacta were stimulated by (—)-nicotine bitartrate (1.0 mg/kg s.c.). This action was prevented by the secondary amine mecamylamine (2.0 mg/kg i.v.) but not by a ganglion-blocking dose of the bisquaternary compound chlorisondamine (0.1 mg/kg i.v.). Nicotine, when administered intravenously (2 to 128 μg/kg cumulative dose), also dose-dependently stimulated dopamine cells. Similar administration of nicotine markedly excited nondopamine cells in the pars reticulata in a dose-related manner. In chlorisondamine-pretreated rats (0.1 mg/kg i.v.), nicotine induced a small excitatory or depressant action, but marked excitation was not observed. Mecamylamine (2 mg/kg i.v.) completely prevented the actions of nicotine. Results are consistent with a direct excitatory action of nicotine on dopaminergic neurons of the substantia nigra pars compacta. The pronounced excitatory action of nicotine on nondopamine cells of the pars reticulata appears to be of peripheral origin. (Auth. Abs. Mod.)

86–0671. Cowan, L.D.; Wilcosky, T.; Criqui, M.H., et al. **Demographic, Behavioral, Biochemical, and Dietary Correlates of Plasma Triglycerides. Lipid Research Clinics Program Prevalence Study.** *Arteriosclerosis* 5(5):466-480, September-October 1985.

Of eight nondietary factors examined, smoking, age, Quetelet Index, and fasting plasma glucose were positively associated ($p<0.0001$) with triglycerides in men and in women not using estrogen. Among women using oral contraceptives or estrogens, only smoking ($p=0.01$) and Quetelet Index ($p<0.01$) were significantly related to triglyceride values. Physical activity was inversely associated ($p<0.0001$) and use of diuretic medications was positively related ($p<0.01$) to triglycerides only in men. Results for triglycerides and six selected dietary measures varied by age, sex, and hormone use. Although none of the dietary variables showed consistent associations with triglycerides across all groups, triglycerides tended to be inversely associated with total calories/kg body weight and the percentage of calories as dietary fat. Data were from 5,189 white men and women aged 20 to 69 years who participated in the Lipid Research Clinics Program Prevalence Study. (Auth. Abs. Mod.)

86–0672. Csonka, E.; Somogyi, A.; Augustin, J., et al. **The Effect of Nicotine on Cultured Cells of Vascular Origin.** *Virchows Archiv A. Pathological Anatomy and Histology* 407(4):441-447, 1985.

The effects of low concentrations of nicotine (10^{-4} to 10^{-9} mol final concentration) on the cytoskeletal system of bovine and porcine endothelial, porcine smooth muscle, and human fibroblast cells were investigated to help determine the role of nicotine in arteriosclerosis. Effects were registered as changes in synthesis and polymerization of the cytoskeleton. The silver and gold impregnation method produced anisotropy of the synthetic granules and of the final polymers of microtubules and filaments under physiological conditions as revealed by polarization microscopy. Since the orientation of cells was inhomogenous in cultures, organization of the orientation was expressed as the sum of alternative diagonal and orthogonal measures of anisotropy by a computerized microraster morphommetry system joined to an Opton cytophotometer. Cultures were also examined by transmission electron microscopy. Nicotine stimulated synthesis and polymerization of cytoskeletal protein in smooth muscle and endothelial cells; however, fibroblasts were not influenced by the concentrations of nicotine used. Since sensitivity of different cells to nicotine was not the same, research should be extended to other nicotine concentrations and other cell types. (Auth. Abs. Mod.)

86–0673. Das, M.; Srivastava, S.P.; Seth, P.K., et al. **Brain Microsomal Enzyme Mediated Covalent Binding of Benzo(*a*)pyrene to DNA.** *Cancer Letters* 25(3):343-350, January 1985.

In vitro studies show that rat brain microsomes catalyze binding of benzo(*a*)pyrene (BaP) to calf thymus DNA. Using brain microsomes from both control and 3-methylcholanthrene (3-MC)-treated rats, the influence of incubation time, pH, protein concentration, BaP dosage, and NADPH levels were determined. Binding of (^{3}H)BaP to DNA increased with increasing amounts of brain microsomal protein up to 16.0 mg. Further increases in microsome levels produced a decline in binding activity. Binding increased linearly with incubation time, peaking at 60 minutes. Optimal pH was 7.5. Increasing BaP levels from 0.4 to 2.4 nmol and increasing NADPH concentration up to 8.8 mg/reaction mixture also increased binding. Treatment with 3-MC resulted in a 1.53-fold increase in microsome-mediated binding, while monooxygenase enzyme inhibitors, such as α-naphthoflavone, metyrapone, 1-benzylimidazole, and ellagic acid, significantly inhibited binding.

86–0674. Fishbein, L. **An Overview of Environmental and Toxicological Aspects of Aromatic Hydrocarbons. IV. Ethylbenzene.** *Science of the Total Environment* 44(3):269-287, September 1985.

The solvent aspects of exposure to ethylbenzene are reviewed via an initial examination of the production, use, occurrence, and disposition of ethylbenzene and populations potentially at risk from exposure. In addition to potential occupational exposures, the general public can be exposed to ethylbenzene in ambient air as a result of its occurrence in automobile exhaust and cigarette smoke. Analysis of the alkylbenze content of cigarette smoke from cigarettes of several countries reveals levels of ethylbenzene ranging from 7 to 20 µg/g cigarette weight. Smokers or those passively exposed to cigarette smoke can therefore be exposed to average ethylbenzene concentrations significantly higher than those experienced by urban populations exposed to high levels of automobile exhaust. Review of the literature indicates that ethylbenzene is primarily an irritant to the skin and mucous membranes and possesses narcotic properties at high concentrations. (Auth. Abs. Mod.)

86–0675. Frecker, R.C. **Eye Movement Measurement and the Pharmacodynamics of Tobacco Dependence.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 121-129.

Eye movement, theorized as being sensitive to the drug-altering effects on arousal and cognitive functions, will be measured in tobacco dependence studies utilizing specially designed instrumentation and techniques for high-precision, real-time interaction with the human visual system. To systematically examine the role of pharmacological modulators in tobacco dependence, a submicron nicotine aerosol generator was developed to deliver controlled and cumulative doses of nicotine, the constituent currently considered to be responsible for the addictive properties of tobacco. A noncontacting high-speed and wide-range eye tracker, designed ergonometrically for human clinical trials, will precisely measure the infrastructure of both saccadic eye movements and miniature movements associated with fixation. The new approach resolves some of the ethical difficulties of chronically (or even acutely) exposing people to nicotine, demonstrated as an addictive drug. An overview of future experimental plans utilizing the technologically advanced instrumentation is provided.

86–0676. Fukuma, M.; Seto, Y.; Fujita, H., et al. **Tanjunhochin Wilus no Soshokuni Oyobosu Seikatsu Kankyo Butsushitsu no Eikyo. [Effect of Environmental Substances on the Replication of Herpes Simplex Virus In Vitro.]** *Chemotherapy* 33(5):421-426, May 1985, Japanese.

Some food and cosmetic dyes (amaranth, erythrosine, rhodamine B) inhibited plaque formation of herpes simplex virus (HSV-2); however, nicotine, safrole, phenacetin, and dyestuff materials (2-acetylaminofluorene, 2-AAF) did not affect plaque formation of HSV-2. In a one-step growth test, nicotine enhanced the growth of HSV-2, while amaranth, erythrosine, rhodamine B, and safrole inhibited growth. Also, nicotine enhanced plaque formation of UV-irradiated HSV-2. Nicotine is known to enhance the DNA repair system. Using similar mechanisms, nicotine may enhance replication of HSV-2 and repair UV-damaged viral DNA in infected cells. Phenacetin and 2-AAF did not affect virus growth. HSV-2-induced thymidine kinase activity was reduced by amaranth with higher doses compared with that inhibiting virus growth. Other compounds tested did not affect thymidine kinase activity in HSV-2 infected cells. Experiments showed that some environmental substances affect replication of HSV-2 and may influence onset and chemotherapy of HSV-infectious diseases. (Auth. Abs. Mod.)

86–0677. Garner, R.C.; Stanton, C.A.; Martin, C.N., et al. **Rat and Human Explant Metabolism, Binding Studies, and DNA Adduct Analysis of Benzo(*a*)pyrene and Its 6-Nitro Derivative.** *Cancer Research* 45(12, Part 1):6225-6231, December 1985.

Human colon and bronchus tissue explants were incubated with either (^{3}H)benzo(*a*)pyrene ((^{3}H)BaP) or (^{3}H)-6-nitrobenzo(*a*)pyrene (6-NBaP). Metabolism was 8 to 59 percent and 18 to 41 percent, respectively, in bronchus and 11 to 23 percent and 36 to 50 percent, respectively, in colon. BaP and 6-NBaP bound covalently to bronchial DNA at means of 42 and 50.9 pmol/10 mg DNA, respectively, and to colon DNA at means of 66.5 and 35 pmol/10 mg DNA, respectively. Chromatographic analysis (HPLC) of bronchial explant DNA revealed one adduct that cochromatographed with (±)-7,8-dihydroxy-9, 10-epoxy-7, 8, 9, 10-tetrahydrobenzo(*a*)pyrene-deoxyguanosine and a possible two adducts from the 6-NBaP-incubated bronchus that eluted earlier than the BaP adduct. Analysis of DNA from rats given BaP or 6-NBaP i.p. showed three DNA adducts in liver and two in lung DNA hydrolysates from rats given BaP. One adduct from each organ cochromatographed with (±)-7,8-dihydroxy-9,10-epoxy-7,8,9,10- tetrahydrobenzo-(*a*)pyrene-deoxyguanosine; however, the major adduct in each case eluted earlier. Only one adduct was detected in liver and lung DNA hydrolysates from rats given 6-NBaP. When 6-NBaP was incubated with induced rat liver S9 in *Salmonella typhimurium* TA98, HPLC revealed three adducts, two of which cochromatographed with the two DNA adducts isolated from human bronchus. All major DNA adducts from explants treated with 6-NBaP cochromatographed with the major adduct isolated from liver and lung DNA of rats treated with BaP, indicating that the adducts are structurally similar. (Auth. Abs. Mod.)

86–0678. Grasmick, C.; Huel, G.; Moreau, T., et al. **The Combined Effect of Tobacco and Alcohol Consumption on the Level of Lead and Cadmium in Blood.** *Science of the Total Environment* 41(3):207-217, March 1, 1985.

Comparison of blood lead (Pb-B) levels according to smoking habits revealed an increase in both current and former smokers compared with nonsmokers in an investigation of the simultaneous effect of tobacco and alcohol consumption on Pb-B and cadmium blood (Cd-B) levels in 6,437 people. Average Pb-B of those who drank alcohol remained higher than that of nondrinkers, according to each individual's smoking habit and regardless of sex. The effects specific to alcohol and tobacco were significant for both sexes ($p<0.001$). Higher mean Cd-B levels were observed in current smokers than in ex-smokers and nonsmokers in both sexes. When both alcohol and smoking habits were considered, lower average Cd-B levels were observed in drinkers than in nondrinkers, regardless of smoking habits. The individual effects of the two factors were highly significant in both men and women ($p<0.001$). A dose—response relationship between Cd-B and number of cigarettes smoked/day was observed in male drinkers ($p<0.02$) and female nondrinkers ($p<0.002$). It is concluded that, in addition to the known direct effects of alcohol on Pb-B and tobacco on Cd-B, secondary interactive effects occur via an unknown mechanism.

86–0679. Grayson, J.; Oyebola, D.D.O. **Effect of Nicotine on Blood Flow, Oxygen Consumption and Glucose Uptake in the Canine Small Intestine.** *British Journal of Pharmacology* 85(4):797-804, August 1985.

The effect of nicotine infusion (25 μg/kg i.v., for 10 minutes) on resting blood flow, arteriovenous glucose and oxygen (A-V)O_2 differences, glucose uptake, and oxygen consumption by a segment of the upper jejunum was measured in untreated anesthetized dogs and in dogs treated with propranolol (0.5 mg/kg) to produce β-adrenoceptor blockade and in dogs after α_1-adrenoceptor blockade with prazosin (0.2 mg/kg). In untreated animals, nicotine caused (1) a pressor response during and hypotensive response after infusion; (2) an increase in jejunal blood flow during the first half of infusion; (3) a reduction in vascular resistance; (4) a reduction in (A-V)O_2 during the first 5 minutes of infusion followed by a return to control levels and subsequent postinfusion rise above control levels; and (5) hyperglycemia during and for about 1 hour after infusion. Present findings are consistent with the hypothesis that nicotine's effect on bowel glucose uptake or release is through the well-established action in releasing catecholamines and in activating β-adrenoceptors. The responses are not related to oxygen utilization. (Auth. Abs. Mod.)

86–0680. Green, G.M. **Mechanisms of Tobacco Smoke Toxicity on Pulmonary Macrophage Cells.** *European Journal of Respiratory Diseases* 66(Supplement 139):82-85, 1985.

Data show that the tobacco smoke component responsible for impairment of pulmonary macrophage bactericidal activity is acrolein. Alveolar macrophages were exposed to tracer-labeled bacteria and phagocytic rates were measured by culturing the medium for over 2 hours. Smoke was filtered with a Cambridge filter and the gas phase separated and analyzed using gas chromatography and a dual flame ionization procedure. Macrophages exposed to smoke showed a dose—response decline in phagocytic activity that did not correlate with tar or nicotine content of the cigarette, indicating that gas phase components were responsible. In vitro exposure to low doses of smoke impaired only the intracellular bactericidal activity; higher doses impaired both intracellular activity and particle uptake. When the gas phase was divided into subfractions, acrolein suppressed bactericidal activity at doses virtually identical to levels found with gas phase cigarette smoke.

86–0681. Grunberg, N.E.; Bowen, D.J. **The Role of Physical Activity in Nicotine's Effects on Body Weight.** *Pharmacology Biochemistry and Behavior* 23(5):851-854, November 1985.

A significant dose—response relationship between nicotine administration and body weight was observed in an investigation of the effects of nicotine on body weight and 24-hour physical activity in rats. Cessation of nicotine administration was accompanied by increased weight gain compared with controls. Changes in body weight during nicotine administration could not be explained by changes in physical activity. However, decreases in physical activity after cessation of administration appeared to contribute to post-drug body weight increases. Results suggest that behavioral factors, i.e., physical activity and specific food consumption, can control weight gains after cessation of smoking. (Auth. Abs. Mod.)

86–0682. Grunberg, N.E.; Bowen, D.J.; Maycock, V.A., et al. **The Importance of Sweet Taste and Caloric Content in the Effects of Nicotine on Specific Food Consumption.** *Psychopharmacology* 87(2):198-203, October 1985.

Consumption of sweet-tasting, low-caloric foods attenuated nicotine effects on body weight in three experiments conducted to examine and compare nicotine effects on food consumption. Alzet miniosmotic pumps were implanted in 63 male rats and saline (controls) or two different concentrations of nicotine (6 or 12 mg/kg/day) were administered for 17 days. Animals had access to two foods: a nonsweet low calorie food and a target food (sweet low calorie, sweet high calorie, or nonsweet high calorie). Body weight, food consumption, and water consumption were measured daily before, during, and after drug administration. In all three experiments there was an inverse relationship between nicotine and body weight. Controls gained more weight than either nicotine group, but after cessation of nicotine, animals in the nicotine groups gained weight at a greater rate than controls. Subsequent weight gain was somewhat attenuated through consumption of sweet-tasting low-caloric foods. It is suggested that smokers who give up cigarettes and want to avoid excessive weight gain should avoid junk food and nutritive sweets. (Auth. Abs. Mod.)

86–0683. Haake, J.M.; Merrill, J.C.; Safe, S. **The In Vitro Metabolism of Benzo(*a*)pyrene by Polychlorinated and Polybrominated Biphenyl Induced Rat Hepatic Microsomal Monooxygenases.** *Canadian Journal of Physiology and Pharmacology* 63(9):1096-1100, September 1985.

The metabolism of benzo(*a*)pyrene (BaP) by halogenated biphenyl-induced rat hepatic microsomal monooxygenases was determined using a high pressure liquid chromatographic assay system. Incubation of BaP with microsomes from rats pretreated with phenobarbitone or phenobarbitone-type inducers (2,2′,4,4′,5,5′-hexachlorobiphenyl, 2,2′,4,4′,6,6′-hexachlorobiphenyl,2,2′,5,5′-tetrachlorobiphenyl, 2,2′,4,4′,5,5′-hexabromobiphenyl, and 2,2′,5,5′-tetrabromobiphenyl) resulted in increased overall metabolism of the hydrocarbon (less than fourfold) into phenolic, quinone, and diol metabolites, with the most striking increase observed in the formation of 4,5-dihydro-4,5-dihydroxy-BaP. In contrast, metabolism of BaP by microsomes from rats induced with 3-methylcholanthrene or 3,3′,4,4′-tetrachlorobiphenyl resulted in a more than tenfold increase in overall BaP metabolism, with the largest increases observed in formation of the trans-7,8-and -9,10-dihydrodiol metabolites of BaP. However, compared with control and phenobarbitone-induced microsomes, the oxidative conversion of BaP by microsomes induced with 3-methylcholanthrene and 3,3′,4,4′-tetrachlorobiphenyl into the 6,12-quinone was substantially inhibited. Metabolism of BaP by microsomes from rats pretreated with the mixed-type inducers 2,3,3′,4,4′-penta-, 2,3,3′,4,4′,5-hexa-, and 2′,3,3′,4,4′,5-hexa-chlorobiphenyl was also increased. The metabolic profile was similar to that observed with fireMaster BP-6- and Aroclor 1254-induced microsomes. (Auth. Abs. Mod.)

86–0684. Haroutunian, V.; Barnes, E.; Davis, K.L. **Cholinergic Modulation of Memory in Rats.** *Psychopharmacology* 87(3):266-271, November 1985.

The effects of cholinergic-enhancing drugs (including nicotine, arecoline, 4-aminopyridine, physostigmine, and oxotremorine) on retention of the passive avoidance response in rats were investigated. Drugs were administered intraperitoneally in a wide range of doses immediately following acquisition of a one-trial passive avoidance task. All of the drugs enhanced 72-hour retention of passive avoidance; however, the effective dose was different for each drug. A significant dose effect was observed for 0.05 and 1.0 mg/kg nicotine, 1.0 mg/kg arecoline, 0.05 and 0.1 mg/kg 4-aminopyridine, 0.03 mg/kg physostigmine, and 0.1 and 0.2 mg/kg oxotremorine, when compared with saline-injected controls. Results show that drugs that affect central cholinergic systems can potentiate retention of an aversively motivated learned behavior. Since the drugs were administered after aversive training had occurred, the drug effects on test performance can be attributed only to a modulatory effect of the drugs on memory processes, not to fear acquisition. (Auth. Abs. Mod.)

86–0685. Harris, C.C.; Vahakangas, K.; Newman, M.J., et al. **Detection of Benzo(*a*)pyrene Diol Epoxide-DNA Adducts in Peripheral Blood Lymphocytes and Antibodies to the Adducts in Serum From Coke Oven Workers.** *Proceedings of the National Academy of Sciences* 82(19):6672-6676, October 1985.

The presence of DNA adducts and related antibodies in blood lymphocytes was measured with synchronous fluorescence spectrophotometry and enzyme radioimmunoassay in coke oven workers (20 smokers, 14 ex-smokers, and 7 never smokers) exposed to high levels of benzo(*a*)pyrene (BaP). BaP is enzymatically activated to 7β,8α-dihydroxy(9α,10α)epoxy-7,8,9,10-tetrahydro-BaP (BaPDE), which forms adducts with DNA. Sufficient DNA was available in 27 of the 41 samples (12 smokers and 15 ex-smokers and nonsmokers) to measure DNA adducts for analysis. In the 18 positive samples (9 smokers and 9 ex-smokers and nonsmokers), there was a range of 0.4 to 34.3 fmol BaP/μg DNA. BaPDE-DNA adducts were not detectable in lymphocytes nor were antibodies to the adducts found in sera from a group of control nonsmoking laboratory workers. Detection of BaPDE-DNA adducts and corresponding antibodies indicates metabolic activation of BaP to an ultimate carcinogen that damages DNA.

86–0686. Jochum, M.; Pelletier, A.; Boudier, C., et al. **The Concentration of Leukocyte Elastase-α1-Proteinase Inhibitor Complex in Bronchoalveolar Lavage Fluids From Healthy Human Subjects.** *American Review of Respiratory Disease* 132(4):913-914, October 1985.

The concentration of elastase-α_1-proteinase inhibitor (elastase-α_1-PI) complex in bronchoalveolar lavage from nine healthy smokers (mean 8.5±4.9 pack-years) and eight nonsmokers was determined to provide evidence that elastase is released and inhibited at the alveolar level. Using a newly developed enzyme-linked immunosorbent assay, the relative concentration of elastase-α_1-PI complex was determined to be 0.33±0.29 mmol/mol albumin in smokers and 0.36±0.48 mmol/mol albumin in nonsmokers. The concentration of elastase-α_1-PI complex did not correlate significantly with smoking rate or with concentration of polymorphonuclear leukocytes present in lavage fluids. The concentration of elastase-α_1-PI complex measured is considered high, although it represents only 0.3 percent of total α_1-PI, and confirms that α_1-PI acts as an efficient antielastase barrier in the lower respiratory tract. The lack of difference observed between smokers and nonsmokers is attributed in part to (1) the relatively short smoking history of the volunteers, and (2) the disappearance of elastase-α_1-PI complexes from the lung surface of smokers during the 24-hour abstinence period that preceded lavages.

86–0687. Kahn, G.C.; Boobis, A.R.; Brodie, M.J., et al. **Phenacetin *O*-Deethylase: An Activity of a Cytochrome P-450 Showing Genetic Linkage With That Catalysing the 4-Hydroxylation of Debrisoquine?** *British Journal of Clinical Pharmacology* 20(1):67-76, July 1985.

Research on the association between phenacetin *O*-deethylase activity and debrisoquine 4-hydroxylase activity in man revealed that cigarette smoking is associated with a significant increase in both the high ($p<0.01$) and low ($p<0.05$) affinity components of phenacetin *O*-deethylase activity, but has no effect on debrisoquine 4-hydroxylase activity. Other findings showed (1) impairment of phenacetin *O*-deethylase activity in poor metabolizers (PM) of debrisoquine; (2) no impairment of acetanilide, amylobarbitone, or antipyrine oxidation in PM phenotype; and (3) a good correlation between the high affinity component of phenacetin *O*-deethylase and debrisoquine 4-hydroxylase activities. Although debrisoquine was a competitive inhibitor of phenacetin *O*-deethylase activity, phenacetin had no effect on debrisoquine 4-hydroxylation. It is concluded that the high affinity component of phenacetin *O*-deethylase and debrisoquine 4-hydroxylase activities are catalyzed by different isozymes of cytochrome P-450 and that the high affinity component of phenacetin *O*-deethylase is inducible by cigarette smoking.

86–0688. Kato, T.; Kameyama, M.; Nakamura, S., et al. **Cyanide Metabolism in Motor Neuron Disease.** *Acta Neurologica Scandinavica* 72(2):151-156, August 1985.

Cyanide concentrations in whole blood, saliva, and urine were measured in 83 patients with motor neuron disease (MND, 39 smokers) and age- and sex-matched controls (62 patients (20 smokers) with and 49 (23 smokers) without neurological disorders). Blood of smokers contained a high level of cyanide more frequently than blood of nonsmokers in the MND group, but a statistically significant difference was not observed in the neurologic or nonneurologic control groups. Saliva of smokers in all three groups showed a high cyanide level more frequently than nonsmokers ($p<0.01$), but no differences were observed in urinary cyanide levels between smokers and nonsmokers in each group. Overall, blood and urine cyanide levels of MND patients were significantly higher than for controls in smokers and nonsmokers. Cyanide levels in whole blood of MND patients were also higher than the neurologic control group among smokers, but not among nonsmokers. Because results suggest that MND patients possess a disorder in cyanide metabolism, it is recommended that they be advised to avoid smoking and cyanogenetic foods because of the possible toxic effects of high cyanide levels. (Auth. Abs. Mod.)

86–0689. Kizawa, Y.; Takayanagi, I. **Mechanism of Action of Nicotine on Crab-Eating Monkey Isolated Bronchial Smooth Muscle.** *Canadian Journal of Physiology and Pharmacology* 63(11):1471-1473, November 1985.

Cholinergic nerves played an important role in the contractile response to nicotine in the isolated crab-eating monkey bronchus. Contractile mechanisms for nicotine in the monkey bronchus appear to be similar to those in the rabbit bronchus but not to those in the guinea pig bronchus. The pharmacological properties of the bronchial smooth muscle of the crab-eating monkey is reported to be qualitatively similar to human muscle. Nicotine induced a phasic contraction in the isolated monkey bronchial smooth muscle preparation. The contractile response to nicotine was abolished by hexamethonium and atropine and potentiated by physostigmine. The response was not influenced by tetrodotoxin. Results suggest that the response to nicotine was mediated through the release of acetylcholine and that the nicotine-induced response may be produced through a sodium action potential independent process. (Auth. Abs. Mod.)

86–0690. Kunkel, D.B. **The Toxic Emergency. Tobacco and Friends.** *Emergency Medicine* 17(19):142-146, 148, 151-152, 157-158, November 1985.

Nicotine-containing plants, plants containing equally hazardous and related compounds, and their varied uses and abuses are discussed from a treatment perspective. Nicotine is well absorbed after inhalation, being active in brain cells within 7 or 8 seconds (faster than by injection). It is efficiently absorbed through the skin after contact with moist products, e.g., green-tobacco illness (tobacco picker's disease). Stomach absorption is poor however, owing to ion-trapping effects in acid gastric juices, a condition that has been the salvation of many children ingesting otherwise lethal doses of nicotine in cigarette butts. Other pharmacologic effects of nicotinic alkaloids are described. The most prevalent use of nicotine-containing plants is mind alteration through ritual or addictive use. Mind-bending effects in chronic smokers differ, are somewhat unclear, and are muddied by physiologic addiction. Types of tobacco use (clove cigarette, chewing tobacco, nicotine gum, etc.) and their effects are reviewed. Nicotine is also found in pesticides and is used in veterinary medicine. Also included is a list of tobacco substitutes and additives and methods for treating acute exposures.

86–0691. Kurokawa, M.; MacLeod, M.C. **Differences in the Binding of Stereoisomeric Benzo(*a*)pyrene-7,8-diol-9,10-epoxides to Histones in Rat Liver Nuclei.** *Cancer Research* 45(11, Part 2):5741-5745, November 1985.

The covalent binding of two stereoisomeric benzo(*a*)pyrene-7,8-diol-9,10-epoxides to histones was compared. From rat liver nuclei exposed to carcinogenic (^{3}H)-(±)-7r,8t-dihydroxy-9t,10t-oxy-7,8, 9,10-tetrahydrobenzo(*a*)pyrene ((^{3}H)BPDE-I) or noncarcinogenic (^{3}H)-(±)-7r,8t-dihydroxy-9c,10c-oxy-7,8, 9,10-tetrahydrobenzo(*a*)pyrene ((^{3}H)BPDE-II), H1 and core histone fractions were prepared by differential acid extraction. The specific activity (dpm/mg protein) of the core histone fraction for (^{3}H)BPDE-I was much higher than that of (^{3}H)BPDE-II. In the H1 histone fraction, the binding level of (^{3}H)BPDE-I was lower than that of (^{3}H)BPDE-II. Reverse-phase high performance liquid chromatography showed that histones H2A and H1 were heavily labeled by (^{3}H)BPDE-I and -II, respectively. In particular, the ratio of specific activities for BPDE-I to II in peak C3, which mainly contains H2A-2 variant, was higher than those of other histone H2A variants and other core histones. Results indicate that BPDE isomers have differential binding affinities to histones. The covalent binding of BPDE-I to histone H2A (especially H2A-2 variant) may be important in the potential carcinogenic effects in nuclei. (Auth. Abs.)

86-0692. Landrigan, P.J.; Straub, W.E. **Occupational Lead Exposure Aboard a Tall Ship.** *American Journal of Industrial Medicine* 8(3):233-239, 1985.

Higher blood lead levels were found in shipfitters who smoked (mean 47 μg/dL) than in nonsmokers (mean 32 μg/dL, $p=0.03$), probably resulting from transfer of lead dust from fingers to the mouth during smoking. Data on cutters and riveters of lead-painted iron plates aboard an iron-hulled "tall ship" revealed that lead exposures in seven personal (breathing zone) air samples ranged from 108 to 500 $\mu g/m^3$ (mean 257 $\mu g/m^3$), all above the Occupational Safety and Health Administration standard of 50 $\mu g/m^3$. In two short-term air samples obtained while exhaust ventilation was temporarily disconnected, mean lead exposure rose to 547 $\mu g/m^3$. Blood lead levels in 10 shipfitters ranged from 25 to 53 μg/dL (mean 37.8 μg/dL); in 3, levels exceeded the upper normal limit of 40 μg/dL. Blood lead levels in shipfitters were significantly higher than in other shipyard workers (mean 10.0 μg/dL, $p<0.001$). Lead levels in shipfitters who wore respirators were not lower than in those who wore no protective gear ($p=0.68$). Four shipfitters had erythrocyte protoporphyrin (EP) concentrations above the adult upper normal limit of 50 μg/dL. A close correlation was found between blood lead and EP levels ($r=0.70$). Prevalence of lead-related symptoms was no higher in shipfitters than in other workers. (Auth. Abs. Mod.)

86-0693. Lee, E.H.Y. **Effects of Nicotine on Exploratory Behavior in Rats: Correlation With Regional Brain Monoamine Levels.** *Behavioural Brain Research* 17(1):59-66, September 1985.

Nicotine (0.5 mg/kg) increased locomotor activity without significantly changing other exploratory behavior in male rats. Low doses (0.2 mg/kg) did not produce any effect on exploration, while high doses (0.8 mg/kg) produced a state of ataxia in animals and decreased most exploration activity. Additionally, nicotine at high doses seemed to reduce animal's state of fear and anxiety, while at low dose the drug appeared to increase the animal's level of curiosity in a novel environment. Biochemically, nicotine has been found to accelerate dopamine synthesis and norepinephrine turnover and to decrease serotonin turnover. More important, the amino acid precursors tyrosine and tryptophan were found to be neurochemical measures most related to behavioral changes produced by nicotine. (Auth. Abs. Mod.)

86-0694. Lehrer, S.B.; McCants, M.; Aukrust, L., et al. **Analysis of Tobacco Leaf Allergens by Crossed Radioimmunoelectrophoresis.** *Chemical Allergy* 15(4):355-361, July 1985.

The reactivity of 11 persons sensitive to tobacco smoke and 8 nonsensitive individuals was tested by crossed radioimmunoelectrophoresis (CRIE). All had immunoglobulin E (IgE) antibodies to tobacco leaf antigens as measured by the radioallergosorbent test (RAST) and 17 were atopic. Of 37 tobacco leaf precipitins detected by cross immunoelectrophoresis (CIE), 3 were identified as allergens by CRIE. All participants reacted to at least one of the three allergens. However, neither the intensity nor the incidence of reactivity with any of the three allergens correlated with smoking or smoke sensitivity. It is suggested that the responses to the allergens may not be related to tobacco leaf or smoke exposure, but rather to exposure to other members of the plant family *Solanaceae* to which tobacco belongs. It has been reported that tobacco glycoprotein is present in many different vegetable products. Perhaps ingestion of any of the various plant antigens could stimulate production of IgE antibodies. The response to tobacco allergens could thus reflect exposure to cross-reacting allergens of nontobacco origin. (Auth. Abs. Mod.)

86-0695. Levene, C.I.; Bartlet, C.P.; Fornieri, C., et al. **Effect of Hypoxia and Carbon Monoxide on Collagen Synthesis in Cultured Porcine and Bovine Aortic Endothelium.** *British Journal of Experimental Pathology* 66(4):399-408, August 1985.

Biochemical and ultrastructural comparison of the effects of hypoxia and carbon monoxide (two factors associated with cigarette smoke) on cultured porcine and bovine aortic endothelium showed that there is a clear difference between the two species. Effects on cell numbers, total protein including collagen/10^4 cells, collagen type profile, and ultrastructure were studied after 24 hours of treatment. Severe hypoxia depressed the cell number in both species; carbon monoxide enhanced decline in porcine endothelium, but counteracted decline in bovine endothelium. Effects on protein synthesis including collagen differed depending on the nature of the insult. In general, carbon monoxide tended to reverse the action of hypoxia, a finding supported by ultrastructural evidence. Phenotypic collagen profiles were unaffected by either hypoxia or carbon monoxide. Hypoxia was selected as a potential atherogenic insult since cigarette smoking is a major risk factor for myocardial infarction. Hypoxia is caused by formation of carboxyhemoglobin in blood as a result of carbon monoxide; carbon monoxide itself can also be directly injurious to the vascular system. (Auth. Abs. Mod.)

86-0696. Mikuni, T.; Tatsuta, M.; Kamachi, M. **Production of Hydroxyl-Free Radical by Reaction of Hydrogen Peroxide With *N*-Methyl-*N'*-nitro-*N*-nitrosoguanidine.** *Cancer Research* 45(12, Part 1):6442-6445, December 1985.

The interaction of free radicals derived from N-methyl-N'-nitro-N-nitrosoguanidine (MNNG) with hydrogen peroxide (H_2O_2) on exposure to light resulted in the production of hydroxyl free radical (·OH). Generation of ·OH via MNNG and H_2O_2 was examined by electron spin resonance using the ·OH spin trapping agent 5,5-dimethyl-1-pyrroline-1-oxide (DMPO). The electron spin resonance spectra of the H_2O_2-MNNG-DMPO system after exposure to light (0.03 mW/cm^2 for 5 min) and the DMPO-(·OH) spin adduct (2-hydroxy-5,5-dimethyl-1-pyrroline-1-oxide) generated by use of Fenton's reagent showed the same hyperfine structure and *g*-value. The signal of the DMPO adduct obtained in the H_2O_2-MNNG-DMPO system disappeared on addition of the ·OH scavenger sodium benzoate. The addition of another ·OH scavenger, ethanol, resulted in the appearance of a new signal due to trapping of the α-hydroxyethyl radical. Findings indicate that ·OH was formed in the H_2O_2-MNNG-DMPO system. The typical signal of the DMPO-(·OH) spin adduct was not observed in the system in the absence of light. The amount of DMPO-(·OH) spin adduct increased with increase in the concentration of H_2O_2 when the MNNG level was kept constant, and it changed with the concentration of MNNG at a constant H_2O_2 level, indicating that ·OH was produced by the interaction of MNNG with H_2O_2. In the absence of H_2O_2, complicated trapped signals appeared in the spectrum of the MNNG-DMPO system in the light, but these signals were not observed when the system was kept in the dark. In the absence of MNNG, the H_2O_2-DMPO system did not show any signal, even in the light. (Auth. Abs. Mod.)

86-0697. O'Dell, S.L.; Peterson, D.F. **Role of Peripheral Chemoreceptors in Response to Smoke-Induced Apnea vs. Tracheal Occlusion.** *Experientia* 41(9):1130-1131, September 1985.

Influence of intact peripheral chemoreceptors on nasopharyngeal reflex response to cigarette smoke was studied by comparing cardiovascular responses produced by smoke to those produced by tracheal occlusion, both before and after sino-aortic denervation. Previous observations that stimulation of nasopharyngeal irritant receptors with smoke produces profound bradycardia, apnea, and a rise in blood pressure were confirmed. Heart rate changes observed during smoke-induced apnea were influenced in part by peripheral chemoreceptor stimulation, whereas blood pressure changes were not. Tracheal occlusion caused slowly developing bradycardia, but did not produce significant blood pressure change. Bradycardia was nearly abolished by sino-aortic denervation, indicating direct chemoreceptor involvement. In contrast, during smoke-induced apnea, bradycardia after sino-aortic denervation was still profound even though it was significantly less than when all peripheral chemoreceptors were intact. Hypertension accompanied smoke-induced apnea, but did not occur during tracheal occlusion. (Auth. Abs. Mod.)

86-0698. Pawlik, W.W.; Jacobson, E.D.; Banks, R.O. **Actions of Nicotine on Renal Function in Dogs (42046).** *Proceedings of the Society for Experimental Biology and Medicine* 178(4):585-590, April 1985.

Renal excretory and circulatory responses to nicotine were investigated in anesthetized dogs under three conditions: (1) infusion of nicotine into the left renal artery (IA) at 0.5 μg/min/kg for 15 min; (2) IA nicotine after 1.0 mg/kg IA propranolol; and (3) IA nicotine after bilateral adrenalectomy. Measured and calculated left and right renal excretory variables included sodium, potassium, and chloride excretion rates ($U_{Na}V$, U_KV, and $U_{Cl}V$, respectively); total solute excretion ($U_{Osm}V$); glomerular filtration rate (GFR); fractional rate (FE_{Na}); and urine flow rate. Systemic arterial pressure and left renal artery blood flow (RBF) were also measured. In seven dogs administered nicotine, there were significant increases in $U_{Na}V$, $U_{Cl}V$, $U_{Osm}V$, GFR, and urine flow rates from both kidneys. However, nicotine did not significantly affect U_KV, FE_{Na}, arterial pressure, or RBF. The lack of circulatory effects of nicotine was also observed after either propranolol or adrenalectomy. However, when nicotine was administered after propranolol, the drug evoked significant decreases in $U_{Osm}V$, $U_{Na}V$, $U_{Cl}V$, and GFR, compared with prenicotine values. Nicotine administered after bilateral adrenalectomy evoked decreases in the excretory parameters similar to those observed after propranolol. Results suggest that (1) nicotine stimulates renal excretory functions (the alkaloid is saluretic and diuretic); (2) the action of nicotine on the kidney is mediated mainly by the release of catecholamines from the adrenal medulla; (3) catecholamines released by nicotine act mainly on β-adrenergic receptors; and (4) the saluresis prompted by release of catecholamines in response to nicotine is due to a subsequent increase in GFR. (Auth. Abs. Mod.)

86-0699. Pechacek, T.F.; Folsom, A.R.; de Gaudermaris, R., et al. **Smoke Exposure in Pipe and Cigar Smokers. Serum Thiocyanate Measures.** *Journal of the American Medical Association* 254(23):3330-3332, December 20, 1985.

Since individuals smoking four or more pipe bowls/day or four or more cigars/day were found to be exposed to smoke equivalent to about 10 cigarettes/day, cigarette smokers should be advised to quit rather than to switch to pipes or cigars. To clarify smoke exposure levels from cigar and pipe (CP) smoking, serum thiocyanate (SCN) levels and smoking histories were studied in 9,106 adults aged 25 to 74 years. Among 306 male CP smokers, ex-cigarette-smokers had significantly higher SCN levels than CP users who never smoked cigarettes. Serum thiocyanate levels of both CP groups were significantly higher than those of nonsmokers and lower than cigarette-only smokers. However, the number of pipe bowls or cigars smoked/day was also significantly related to SCN levels, perhaps accounting for much of the association between SCN and previous cigarette smoking status. (Auth. Abs. Mod.)

86–0700. Petitti, D.B.; Kipp, H. **The Leukocyte Count: Associations With Intensity of Smoking and Persistence of Effect After Quitting.** *American Journal of Epidemiology* 123(1):89-95, January 1986.

High leukocyte counts associated with cigarette smoking persisted after smoking cessation among 62,541 adults examined from 1979 to 1982. In 16,624 current regular cigarette smokers, leukocyte counts were higher in heavy smokers and were associated with high tar and nicotine yields, deep inhalation, and longer duration of smoking. Blacks registered lower leukocyte counts than whites and men had lower counts than women for the same number of cigarettes smoked. The estimated decrease in leukocyte count in blacks compared with whites was large (865), and the decrease was also large for men compared with women (419). In 14,336 ex-smokers, leukocyte count was related to time since quitting. Estimated difference in leukocyte counts between never smokers and ex-smokers was moderate (128), determined by multiple linear regression analysis of never smokers matched for age, sex, and race with ex-smokers (mean 10.8 years abstention). It is suggested that delineation of the physiologic basis for acute and chronic effects of cigarette smoking on leukocyte count might lead to a better understanding of the mechanisms for regulation of granulopoiesis and release and destruction of leukocytes. (Auth. Abs. Mod.)

86–0701. Pidetcha, P.; Sorndaeng, S.; Tantrarongroj, S., et al. **Karn-Truaj-Saka-Tang-Hong-Patibat-Karn-Kong-Pnnak-Ngan Rong-Ngan-ya-Soop. [Laboratory Screening Programme for Thailand Tobacco Monopoly Workers].** *Siriraj Hospital Gazette* 37(1):31-36, January 1985, Thai.

The 1,008 Thailand Tobacco Monopoly workers screened had consistently higher levels of blood constituents relating to liver and cardiac fenction than the general population. Clinical chemistry laboratory checkup examinations of workers (aged 25 to 65 years) showed that 60.9 percent were female, 13.4 percent were vegetarians, 12.9 percent were habitual drinkers, and 24.3 percent were smokers. Of the 38.9 percent who were undergoing regular physical examinations, 16 percent were for high blood pressure and 11.9 percent were for diabetes mellitus. Laboratory analyses of blood samples indicated 2 percent positive for hepatitis A antigen and abnormal levels of 4.6 percent for blood glucose, 3.7 percent for cholesterol, 2.8 percent for alkaline phosphatase, 2.3 percent for uric acid, 1.3 percent for transaminase (SGOT 2.1 percent and SGPT 1.3 percent), 0.2 percent for total protein, and 0.1 percent for creatinine. It is recommended that special attention be given to re-examining workers every 6 to 12 months. (Auth. Abs. Mod.)

86–0702. Pryor, W.A.; Dooley, M.M.; Church, D.F. **Mechanisms of Cigarette Smoke Toxicity: The Inactivation of Human α-1-Proteinase Inhibitor by Nitric Oxide/Isoprene Mixtures in Air.** *Chemico-Biological Interactions* 54(2):171-183, July 1985.

Buffered solutions of α_1-proteinase inhibitor (α_1-PI) were exposed to puffs of air containing simulated gas-phase cigarette smoke (300 ppm nitric oxide (NO) and 400 ppm isoprene). Bubbling of the NO/air/isoprene gas stream directly through buffered protein solutions caused α_1-PI to undergo a rapid loss of elastase inhibitory capacity similar to that observed following exposure to gas-phase cigarette smoke. This rapid inactivation was not observed when α_1-PI was exposed to aqueous extracts of the NO/air/isoprene mixture. Both direct gas exposure and exposure to aqueous extracts caused α_1-PI to undergo a slow loss of activity that continued for several days during incubation in buffer solutions. The α_1-PI inactivation observed was dependent on the presence of oxygen in the gas stream, suggesting that oxidation of NO to nitrogen dioxide is involved in the formation of inactivating species. The nature of these species remains to be determined; however, small alkoxyl or peroxyl radicals do not appear to inactivate α_1-PI. Inactivating species are possibly metastable compounds formed by radical processes in actual and simulated gas-phase cigarette smoke. (Auth. Abs. Mod.)

86–0703. Ratner, D.; Eshel, E.; Vigder, K. **Har'alat Pahman Had-Hamtsani Ve'ishun Sigariot. [Carbon Monoxide Poisoning and Cigarette Smoking.]** *Harefuah* 108(4):181-182, February 1985, Hebrew.

Five patients who were heavy smokers (two packs/day or more) and suffering from chest pain, dyspnea, fatigue, and headache were found to be in the early stage of carbon monoxide poisoning. Blood carboxyhemoglobin (COHb) levels ranged from 14.3 to 19.0 percent and patients became asymptomatic when COHb levels were reduced. Physicians are cautioned to be aware of elevated COHb levels and other symptoms resulting from heavy smoking. Oxygen inhalation provides relief within an hour if symptoms are related to elevated COHb levels. Comparative data for COHb levels are given for nonsmokers, smokers, and professional drivers who are heavy smokers. (Auth. Abs. Mod.)

86–0704. Ravindranath, V.; Boyd, M.R. **Metabolic Activation of 2-Methylfuran by Rat Microsomal Systems.** *Toxicology and Applied Pharmacology* 78(3):370-376, May 1985.

The microsomal metabolism of 2-methylfuran (2-MF), a constituent of cigarette smoke and coffee, to acetylacrolein was characterized and the effect of acetylacrolein on mixed-function oxidases was examined. Hepatic microsomal metabolism of 2-MF required presence of NADPH and oxygen and was dependent on incubation time and substrate concentration. Metabolism was inducible by pretreatment of rats with phenobarbital and was inhibited by piperonyl butoxide and *N*-octyl imidazole, indicating that metabolism of 2-MF may be mediated by cytochrome P-450. Acetylacrolein was a potent inhibitor of mixed-function oxidase and completely inhibited microsomal metabolism of 2-MF, indicating that 2-MF is a suicide substrate for the enzyme. Cysteine, a sulfhydryl nucleophile, was a better trapping agent of acetylacrolein than *N*-acetylcysteine or glutathione. Lysine decreased covalent binding of 2-MF metabolites, presumably by reacting with the aldehyde group of acetylacrolein. In the presence of NADPH, 2-MF was bioactivated by pulmonary and renal cortical microsomes to reactive metabolites that were covalently bound to microsomal proteins. (Auth. Abs. Mod.)

86–0705. Rosecrans, J.A.; Hendry, J.S.; Hong, J.-S. **Biphasic Effects of Chronic Nicotine Treatment on Hypothalamic Immunoreactive β-Endorphin in the Mouse.** *Pharmacology, Biochemistry and Behavior* 23(1):141-143, July 1985.

Hypothalamic but not pituitary immunoreactive β-endorphin (β-E) was reduced 37 percent in mice 24 hours following 30 daily doses of nicotine (1200 μg/kg s.c.). Hypothalamic β-E returned to normal levels within 7 days and rose 50 percent above normal 14 days after cessation of nicotine treatment. None of the other neuropeptides (substance P, neurotensin, or (met^5)-enkephalin) were altered by nicotine treatment. It is suggested that reduction of β-E was a reflection of the inability of hypothalamic neurons to maintain steady-state levels under repeated nicotine-induced reduction of peptide or that alteration of β-endorphin levels was not directly related to nicotine administration but only to withdrawal of nicotine. (Auth. Abs. Mod.)

86–0706. Santella, R.M.; Hsieh, L.-L.; Lin, C.-D., et al. **Quantitation of Exposure to Benzo(*a*)pyrene With Monoclonal Antibodies.** *Environmental Health Perspectives* 62:95-99, October 1985.

A panel of monoclonal antibodies that react with benzo(*a*)pyrene (BaP)-modified DNA was developed for an enzyme-linked immunosorbent assay (ELISA) to quantitate adduct levels of human and animal samples. BALBc/Cr mice were immunized with either DNA modified by 7β, 8α-dihydroxy-9α, 10α-epoxy-7, 8, 9, 10-tetrahydrobenzo(*a*)pyrene (BaPDE-I-DNA) complexed electrostatically to methylated bovine serum albumin or with BaPDE-I-modified guanosine conjugated with bovine serum albumin (BaPDE-I-G-BSA). Four stable clones were produced from the spleen cells of animals immunized with BaPDE-I-DNA and one from BaPDE-I-G-BSA immunized animals. All antibodies were shown to be highly specific for BaPDE-I-DNA and did not crossreact with nonmodified DNA or with N-2-acetylaminofluorene or 1-aminopyrene modified DNA. The antibodies differed in sensitivity to BaPDE-II-DNA, BaPDE-I-poly G, BaPDE-I-tetraols, and BaPDE-I-dG. In general, all antibodies showed the greatest affinity for their original antigen. Those generated against modified DNA showed highest reactivity against modified DNA, while the one antibody generated against the monoadduct showed highest reactivity with the monoadduct. The antibodies are currently being used in a highly sensitive competitive ELISA to quantitate levels of BaP—DNA adducts in various animal and human tissue samples. (Auth. Abs. Mod.)

86–0707. Stowers, S.J.; Anderson, M.W. **Formation and Persistence of Benzo(*a*)pyrene Metabolite—DNA Adducts.** *Environmental Health Perspectives* 62:31-39, October 1985.

In vivo formation of benzo(*a*)pyrene (BaP) metabolite—DNA adducts was characterized in lung, liver, forestomach, colon, kidney, muscle, and brain tissues of mice and rabbits. The major adduct identified in each tissue was the (+)-7β,8α-dihydroxy-9α,10α-epoxy-7,8,9,10-tetrahydro-BaP (BaPDEI)-deoxyguanosine adduct. A 7β,8α-dihydroxy-9β,10β-epoxy-7,8,9,10-tetrahydro-BaP (BaPDEII)-deoxyguanosine adduct, a (-)-BaPDEI-deoxyguanosine adduct, and an unidentified adduct were also observed. Adduct levels were similar in all tissues examined from the same BaP-treated animal. Adduct levels were also examined in macrophages, type II cells, and Clara cells from lung and hepatocytes and nonparenchymal cells from liver tissues isolated from BaP-treated rabbits. Results strongly suggest that DNA in many human tissues is continuously damaged from exposure to BaP and other polycyclic aromatic hydrocarbons. Furthermore, DNA adducts formed from BaP are persistent in lung and brain tissues. The persistence of adducts in cell types that have slow turnover rates could result in significant adduct accumulations from long-term exposure to low levels of BaP. (Auth. Abs. Mod.)

86–0708. Sugiyama, H.; Hagino, N.; Moore, G., et al. **(^{3}H)Nicotine Binding Sites in Developing Fetal Brains in Rats.** *Neuroscience Research* 2(5):387-392, June 1985.

(^{3}H)Nicotine binding sites were examined in developing fetal rat brains and binding properties of fetal brain membranes were compared with those of adult brain membranes to help delineate the biochemical properties of nicotinic acetylcholine receptors (nAChR) in the central nervous system. A much lower concentration of specific (^{3}H)nicotine binding sites was found in the fetal brain than in adult brains; however, the properties of (^{3}H)nicotine binding were found to be similar in both brain preparations with respect to (1) affinity of binding sites to (^{3}H)nicotine, and (2) displacement of (^{3}H)nicotine binding by carbamylcholine or unlabeled nicotine with a similar concentration dependency and to an identical extent by large excesses of these ligands. Furthermore, α-bungarotoxin, a potent blocker of peripheral nAChR, at a final concentration of 1×10^{-6} mol had almost no effect on (^{3}H)nicotine binding to both fetal and adult brain preparations. Specific (^{3}H)nicotine binding was first detectable in fetal brain preparations on day

16 of gestation, increasing thereafter to approximately 30 percent of adult levels just prior to birth. (Auth. Abs. Mod.)

86–0709. Tegner, H.; Fryksmark, U.; Ohlsson, K. **The Mucosal Defence Capacity Against Proteolytic Enzymes.** *European Journal of Respiratory Diseases* 66(Supplement 139):62-65, 1985.

Analyses of smokers and nonsmokers with chronic bronchitis showed that granulocyte elastase is present in purulent bronchial secretions and is the dominant cause of elastolytic activity. The primary inhibitors of elastase in the respiratory tract are α_1-antitrypsin and antileukoprotease. Apparently locally produced, antileukoprotease is a potent inhibitor of elastase and accounts for about 90 percent of the inhibiting capacity against elastase. A local protective function of antileukoprotease is suggested by the finding that antileukoprotease was bound to granulocyte elastase in purulent bronchial secretions. The function of α_1-antitrypsin and antileukoprotease is reduced in a dose- and time-dependent way by addition of smoke condensate. Smoke condensate also depresses the enzymatic activity of granulocyte elastase. However, further studies of the protease—antiprotease balance in bronchial secretions from smokers with and without airway disease are necessary before any conclusions can be drawn regarding the pathophysiological significance of results. (Auth. Abs. Mod.)

86–0710. Thompson, J.A.; Norris, K.J.; Petersen, D.R. **Isolation and Analysis of N-Oxide Metabolites of Tertiary Amines: Quantitation of Nicotine-1′-N-Oxide Formation in Mice.** *Journal of Chromatography: Biomedical Applications* 341(2):349-359, June 14, 1985.

Sensitive and selective methods were developed to investigate the formation and elimination of nicotine-1′-N-oxide (NNO, a polar and heat-labile metabolite) in mice treated with a single injection of nicotine. The compound was isolated from tissue homogenates as a dodecyl sulfate ion pair with C_{18} extraction cartridges and analyzed on an amino bonded-phase high-performance liquid chromatographic column with a mobile phase consisting of isopropanol—water. Overall recoveries of NNO were 64 to 76 percent from biological media. Several methods of detection were evaluated. Radiolabeling was necessary to achieve the sensitivity required for pharmacokinetic studies in mice. The cis and trans isomers of NNO were separated on a Partisil PAC column and enzymatic selectivity was evaluated for the formation of these isomers in mice. (Auth. Abs.)

86–0711. Touitou, Y.; Proust, J.; Carayon, A., et al. **Plasma Ferritin in Old Age. Influence of Biological and Pathological Factors in a Large Elderly Population.** *Clinica Chimica Acta* 149(1):37-45, June 30, 1985.

A strong relationship between elevated plasma ferritin and cigarette use was found in 776 elderly patients (80.9±7.9 years, 11 percent smokers) in a study to determine the influence of age, sex, weight, and pathological factors on plasma ferritin levels. A marked shift toward high ferritin values (159±142 μg/L) was observed, as was the persistence of higher levels in men (a well-known sex-related difference). Smokers and alcohol abusers (6.6 percent) showed significantly higher ferritin values than nonsmokers ($p<0.001$) and nondrinkers ($p<0.005$). Overall, 25 percent had high levels of ferritin (≥ 220 μg/L), but 75 percent of these high values could be readily explained by their known association with a particular pathology (inflammatory syndrome, renal failure, cardiovascular diseases, alcoholism). Only 6 percent had unexplained high ferritin concentrations, indicating that an increase in ferritin is not a normal physiological occurrence during aging. (Auth. Abs. Mod.)

86–0712. Valentovic, M.A.; Gairola, C.; Lubawy, W.C. **Cigarette Smoke Exposure Alters (^{14}C)Arachidonic Acid Metabolism in Aortas and Platelets of Rats Fed Various Levels of Selenium and Vitamin E.** *Journal of Toxicology and Environmental Health* 15(3/4):493-502, 1985.

The influence of dietary selenium and vitamin E on prostacyclin (PGI_2) and thromboxane (TXA_2) synthesis in rat aortas and platelets was examined following exposure to cigarette smoke. Rats were placed on a basal diet supplemented with 0, 0.03, or 3 ppm selenium and 0 or 20 ppm vitamin E for 41 to 43 weeks. Animals were separated into smoke-exposed, sham-exposed, and room control groups beginning on week 10 or 11. Rats with selenium deficiency had decreased hepatic glutathione peroxidase activity and lower aortic PGI_2 and platelet TXA_2 production than animals supplemented with selenium and vitamin E. Vitamin E deficiency increased hepatic lipid peroxidation and decreased aortic PGI_2 synthesis. Animals chronically exposed to cigarette smoke showed a nearly twofold increase in pulmonary aryl hydrocarbon hydroxylase activity. Smoke exposure produced a 26 to 33 percent decrease in aortic PGI_2 synthesis compared with shams in the Se_3E_{20}, $Se_{0.03}E_{20}$, and Se_3E_0 groups. Smoking also increased platelet thromboxane 91 and 98 percent, respectively, in the Se_3E_{20} and Se_3E_0 groups. (Auth. Abs. Mod.)

86–0713. Zahran, F.M.; Ardawi, M.S.M.; Al-Fayez, S.F. **Carboxyhaemoglobin Concentrations in Smokers of Sheesha and Cigarettes in Saudi Arabia.** *British Medical Journal* 291:1768-1770, December 1985.

Sheesha smokers may be at greater risk of developing diseases related to carbon monoxide than cigarette smokers, according to a study of carboxyhemoglobin concentrations in 1,832 healthy Saudi Arabian males (256 nonsmokers, 601 cigarette smokers, 975 sheesha smokers). Sheesha is a smoking device widely used in the Arabian peninsula to smoke jurak, which is a mixture of tobacco and fruit cooked to produce a dark paste. Jurak, burnt by an electrical device or by charcoal, is considered by many sheesha smokers to be less harmful to health than smoking cigarettes. Mean carboxyhemoglobin concentrations of sheesha smokers (10.06) were distinctly different from those of cigarette smokers (6.47) and nonsmokers (1.60). There was a linear relationship in sheesha and cigarette smokers between the number of sheeshas ($r=0.84$, $p<0.001$) or cigarettes ($r=0.52$, $p<0.001$) smoked/day and amount of carboxyhemoglobin saturation, respectively. Differences may be related to concentration of carbon monoxide in tobacco smoke, mode of smoking (puffing frequency, inhalation depth, smoking frequency), degree of physical activity, and state of health of the smoker. However, jurak burned in sheesha contributes to high carboxyhemoglobin concentrations and more carbon monoxide is delivered during sheesha smoking because of the charcoal used to burn jurak.

See also, **86–0717, 86–0732, 86–0866, 86–0937**

MORTALITY AND MORBIDITY

86–0714. Anderson, K.; Moran, F. **Low-Tar Cigarettes and Future Mortality. (Letter).** *Lancet* 1(8474):209, January 1986.

Lifelong smoking histories have been taken from asbestos-exposed individuals attending a respiratory unit. Because such patients are especially sensitive to the effects of cigarettes, any future changes in smoking habits will probably have a more striking effect in this group. Of 135 consecutive patients (only 12 never smokers), 77 were smoking less and 38 (30 percent) had stopped. Although 96 originally smoked plain cigarettes, most had switched to filtered cigarettes by the 1970s; however, only 4 of the 85 current smokers are smoking low-tar cigarettes. Any change to low-tar cigarettes may require a similar timespan as initial acceptance of the filter tip, and it is suggested that little emphasis be given to the low-tar cigarette as an improved option for any smoker.

86–0715. Balarajan, R.; Yuen, P.; Bewley, B.R. **Smoking and State of Health.** *British Medical Journal* 291(6510):1682, December 14, 1985.

Ill health was more prevalent in smokers and ex-smokers than in nonsmokers, and increased chronic and acute illness was correlated with number of cigarettes smoked. A 1980 British state of health survey of 23,956 people >16 years of age found that smokers and ex-smokers visited outpatient clinics significantly more often than nonsmokers, and ex-smokers showed greater risks for all variables, irrespective of time since cessation of smoking. Recent ex-smokers consulted doctors most frequently and also suffered most from acute illness, suggesting that cessation of smoking may have been induced by poor health. Higher ratios for consultations with a physician might also be related to counseling associated with preventive strategies. Subjects surveyed were classified as never smokers, ex-smokers (<1 year), ex-smokers (≥1 year), mild smokers (<9 cigarettes/day), moderate smokers (10 to 19 cigarettes/day), and heavy smokers (≥20 cigarettes/day). Chronic illness was more prevalent in smokers after adjustment for age, sex, and socioeconomic group. Odds ratio showed a gradient from mild to heavy smokers. Those who had stopped smoking recently had a relatively lower odds ratio (1:26) than those who had stopped for more than a year (1:43). It is recommended that primary prevention of ill health be emphasized to reduce the load on health services from the use of tobacco.

86–0716. Blair, A.; Hoar, S.K.; Walrath, J. **Comparison of Crude and Smoking-Adjusted Standardized Mortality Ratios.** *Journal of Occupational Medicine* 27(12):881-884, December 1985.

Crude and smoking-adjusted standard mortality ratios (SMRs) for selected occupational groups proved to be remarkably similar, suggesting that absence of information on smoking in occupational risk evaluation may not cause serious error. Errors that do occur appear to be limited to diseases strongly associated with smoking (e.g., lung cancer). Several occupations showed crude and smoking-adjusted SMR differences of 30 or more, an error that may not be acceptable for evaluating moderate and low relative risks. It is suggested that information be obtained for diseases most strongly associated with smoking because (1) strong synergistic effects occur between smoking and occupational exposures (such as asbestos and uranium) and smoking information identifies high-risk subgroups; (2) smoking information avoids false-negative findings among occupations where smoking is less prevalent than in the general population, since nested case—control studies are seldom initiated when SMRs are less than 100; and (3) studies of tobacco-related diseases without data on smoking histories may not appear credible to the public. (Auth. Abs. Mod.)

86–0717. Grimm, R.H., Jr.; Neaton, J.D.; Ludwig, W. **Prognostic Importance of the White Blood Cell Count for Coronary, Cancer, and All-Cause Mortality.** *Journal of the American Medical Association* 254(14):1932-1937, October 11, 1985.

The relationship between white blood cell (WBC) count and fatal and nonfatal coronary heart disease (CHD) incidence and for cancer and all cause mortality was examined in relation to smoking habits in a subset of participants randomized to the usual care group in the Multiple Risk Factor Intervention Trial. In the group of 6,222 middle-aged men (3,955 smokers, 2,267 nonsmokers), total WBC count was found to be strongly and significantly related to CHD, independent of smoking status. WBC count was strongly related cross-sectionally to cigarette smoking and smoking status as indicated by serum thiocyanate concentration. Smokers, on average, had a WBC count of 7,750/mm^3 compared with 6,080/mm^3 for nonsmokers. Among smokers, 61 percent had a WBC count $\geq$ 7,000/mm^3 compared with 23 percent of nonsmokers. Serum thiocyanate levels averaged 131μmol/L for the entire group and were significantly related to CHD mortality ($p<0.01$), CHD mortality or nonfatal myocardial infarction ($p<0.01$), and all cause mortality ($p<0.01$). WBC count was also significantly associated with cancer mortality, independent of reported smoking and serum thiocyanate levels. Serum thiocyanate level was related to cancer mortality, but the association was not significant ($p=0.06$).

86–0718. Kono, S.; Ikeda, M.; Tokudome, S., et al. **Smoking and Mortalities From Cancer, Coronary Heart Disease and Stroke in Male Japanese Physicians.** *Journal of Cancer Research and Clinical Oncology* 110(2):161-164, September 1985.

Risk of lung cancer and coronary heart disease (CHD) was strongly associated with number of cigarettes smoked/day, inhalation level, and age at starting to smoke, among 5,447 male Japanese physicians. The relationship between smoking habits and mortality from cancer, CHD, and stroke over a 12.7-year period was investigated. Current smokers had generally elevated risks for selected causes of death (all causes, all cancers, upper aerodigestive cancer, gastric cancer, lung cancer, CHD, and stroke), and increased risk was statistically significant for all cancers, lung cancer, CHD, and all causes. Although the risk of dying from all causes, CHD, and stroke was increased in ex-smokers, only the increase in mortality from all causes was statistically significant. There was no elevated risk of cancer mortality among ex-smokers. Increased risk with number of cigarettes smoked was noted for all cancers, upper aerodigestive cancer, lung cancer, and CHD (all statistically significant). Although the risk of dying from all causes was similar between men smoking <10 cigarettes/day and those smoking 10 to 19 cigarettes/day, the trend was highly significant. Results also showed that risks of lung cancer and CHD increased with lower age of smoking initiation and increased frequency of smoke inhalation. (Auth. Abs. Mod.)

86–0719. Miller, B.G.; Jacobsen, M. **Dust Exposure, Pneumoconiosis, and Mortality of Coalminers.** *British Journal of Industrial Medicine* 42(11):723-733, November 1985.

Lung cancer mortality among coal miners who smoked was 5.5 times higher than in never smokers, but smokers with pneumoconiosis had slightly lower lung cancer rates than smokers with no pneumoconiosis. Age-specific comparison of 22-year survival rates among 25,000 British coal miners found that miners exposed to excessive amounts of respirable coal dust are at increased risk of premature death from progressive massive fibrosis, chronic bronchitis, or emphysema. Analysis of 315 lung cancer deaths over a 17-year period in those aged 35 to 64 who were smokers (76 percent of the age group) showed that for men with simple pneumoconiosis or progressive massive fibrosis the risk of lung cancer was 18 and 26 percent lower, respectively, than for men whose radiographs indicated no pneumoconiosis. There were only 10 deaths from lung cancer among 2,373 nonsmokers and 16 deaths among miners who were ex-smokers. Differences between smoking categories were highly significant. The lung cancer hazard for smokers was estimated to be 2.3 times the risk for ex-smokers. (Auth. Abs. Mod.)

86–0720. Miller, G.H. **Miller Responds. (Letter).** *Actuarial Update* pp. 3, February 1984.

In reply to comments on an earlier study (*Public Health Reports* 98(4):343-349, July-August 1983) it is stated that more sophisticated statistical analysis of the life expectancy of males and females is needed to estimate accurately longevity differences attributable to gender and smoking habits. Results of the Northwestern Pennsylvania Study on Smoking and Health (NPSSH) do not conform with results of the State Mutual Life Assurance Company study because the latter (1) includes former smokers as nonsmokers, (2) offers a financial incentive to lie about smoking status (nonsmokers are entitled to reduced insurance rates), and (3) population statistics are underrepresented. These differences explain why the NPSSH study shows no excess longevity for women over men for nonsmokers aged 30, while the State Mutual study shows a 3.7 year excess. The insurance industry's present categorization (at least 1 year as a nonsmoker) is a step in the right direction, but more refined categories are necessary to perform valid experience studies for all categories. Traumatic deaths do affect the difference in longevity between men and women and should be considered in determining premium rates. There exists a twofold to threefold increase in traumatic deaths associated with smoking and the increase is smaller for women. The basic conclusion is that a very high proportion of the 7- to 8-year longevity difference between men and women is the result of smoking. See also 84-0082.

See also, **86–0722, 86–0979**

NEOPLASTIC DISEASES

86–0721. Armstrong, B.K. **Occupation and Lung Cancer.** *Medical Journal of Australia* 142(13):680-681, June 24, 1985.

Cigarette smoking is the most important cause of lung cancer in both employed and nonemployed people, and differences in smoking habits probably explain most of the variation in lung cancer risk observed between occupations. Unless the important effects of tobacco smoking are controlled in any study of occupational cancer, it may be difficult to establish the effects of another agent on lung cancer risk. Associations between lung cancer and occupational exposures in rubber manufacture, sugar cane farm employment, welding, vinyl chloride manufacture, manufacture and use of acrylonitrite, work with beryllium, and lead and cadmium smelting have been difficult to establish owing to possible differences in smoking habits between exposed and nonexposed individuals. For example, a study in Canada found that bartenders were the occupational group at highest risk for lung cancer; the carcinogen most likely responsible was concluded to be tobacco smoke, either actively or passively absorbed. Overall, it has been estimated that occupational exposures cause about 15 percent of lung cancer in men and 5 percent in women; most of the rest, at least in men, is due to cigarette smoking.

86–0722. Blair, A.; Walrath, J.; Rogot, E. **Mortality Patterns Among U.S. Veterans by Occupation. 1. Cancer.** *Journal of the National Cancer Institute* 75(6):1039-1047, December 1985.

Mortality in a nationwide cohort of 293,958 veterans was analyzed by occupation, industry, and smoking status to generate hypotheses concerning occupational cancer. Results are presented on 107,563 deaths occurring between 1954 and 1970. Information on usual employment and smoking habits was available from questionnaires completed in 1954 and 1957. Significant associations between mortality and occupation were noted for cancers of the stomach (machinists, carpenters, and operatives), intestines (agents, professional and kindred workers, chemists, wholesale trade, and public administration), rectum (real estate, insurance, and college teaching), lung (pilots, navigators, plumbers, pipefitters, taxi drivers, locomotive engineers, barbers and beauticians, painters, ship officers, metal workers, machinists, and workers in the shipbuilding and repair industry), and prostate (policemen and detectives, engineers, physicians, and salesmen and clerks). Excesses in stomach cancer mortality among carpenters occurred only among smokers, and mortality due to rectal cancer was highest among smokers who were mechanics and repairmen or mail carriers. No significantly elevated standard mortality ratios were observed for bladder cancer; however, the evident deficit among farmers could not be entirely attributed to differences in smoking habits.

86–0723. Boice, J.D., Jr.; Fraumeni, J.F., Jr. **Second Cancer Following Cancer of the Respiratory System in Connecticut, 1935-82.** In: Greenwald, P.; Weisburger, E.K.; Aaronson, S.A., et al. (Editors). *Multiple Primary Cancers in Connecticut and Denmark.* U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute Monograph No. 68, NIH Publication No. 85-2714, December 1985, pp. 83-98.

Smoking as a risk factor for second primary cancer was evaluated in approximately 30,000 persons who developed cancer of the respiratory system in Connecticut between 1935 and 1982. Overall, a significant 44 percent excess of all second cancers was observed following cancer of the lung, 72 percent following cancer of the larynx, and 34 percent following cancer of the nasal sinuses. For cancers of the lung and larynx, second cancers were mainly in the respiratory tract or other sites associated with cigarette smoking (oral cavity, bladder, kidney). A threefold excess of esophageal cancer followed cancer of the larynx, which was indicative of common risk factors including tobacco and alcohol. Risk of second cancer did not appear to vary by sex or time since initial diagnosis, except that risks following cancer of the nasal cavities and sinuses returned to normal levels among long-term survivors. Among persons observed for 10 or more years after initial diagnosis of lung or larynx cancer, risk of developing a second cancer remained high, (i.e., on the order of 50 percent above expectation). (Auth. Abs. Mod.)

86–0724. Brugere, J.; Guenel, P.; LeClerc, A., et al. **Differential Effects of Tobacco and Alcohol in Cancer of the Larynx, Pharynx, and Mouth.** *Cancer* 57(2):391-395, January 1986.

Tobacco and alcohol consumption was compared in 2,540 French male patients with larynx, pharynx, and mouth cancer. Sites examined were oropharynx, hypopharynx, larynx supraglottis, larynxglottis, epilarynx, lip, tongue-tip and tongue lateral border, other tongue sites, gum, floor of the mouth, and buccal mucosa. For tobacco, mean daily consumption of smokers and ex-smokers did not differ according to cancer site (except for cancer of the lip in patients who also had lowest consumption). Relative risk associated with tobacco use (adjusted for alcohol consumption) ranged from 1.7 for cancer of the epilarynx in light users to 48.8 for supraglottis cancer in heavy users. Some differences were observed in type of tobacco smoked (cigarettes, pipe, or cigar). More pipe smokers had cancer of the oropharynx, hypopharynx, and oral cavity. Cancer locations differed significantly according to daily alcohol consumption. Consumption was lowest for patients with cancer of the lips and the glottis, highest for patients with cancer of the epilarynx, hypopharynx, and floor of the mouth. Significant differences were observed in percentage of nonsmokers or nondrinkers, even between adjacent locations. It is suggested that some results may be particular to the French lifestyle (e.g., consumption of brown tobacco and high consumption of wine). (Auth. Abs. Mod.)

86-0725. Burch, P.R.J. **Non-Antipodean Smoking View. (Letter).** *Medical Journal of Australia* 142:238-239, February 4, 1985.

Results of randomized controlled intervention trials, which offer the most direct and unbiased test possible of causal hypotheses, do not support the views of authoritative committees and commissions who have concluded that lung cancer is almost entirely due to cigarette smoking and that smoking is the major single preventable cause of death. Much of the information supporting these conclusions comes from case-control and prospective studies that are inherently self-limited to identify associations; but association does not imply causation. Data from two intervention trials, when combined, reveal that lung cancer rates were actually higher in the intervention groups (0.78 percent) than in the normal care control groups (0.74 percent) after an average of 7- to 10-year followup. Rates for overall mortality were virtually identical at followup: 5.43 percent in the intervention groups and 5.41 in the usual care groups. Overall findings of the two studies do not support the hypothesis that giving up smoking reduces mortality.

86-0726. Burnside, G. **United Against Cancer.** *Nursing Mirror* 161(14):33-35, October 1985.

In Northern Ireland, 4,550 people are directly employed in tobacco manufacturing, constituting 20 percent of the United Kingdom's tobacco industry. Although U.K. sales of manufactured cigarettes have decreased, it is estimated that more people die in 1 month from smoking than from all forms of violence in a year. Last year, 2,130 people died from smoking-related diseases. Smoking control programs are one of several activities of the Ulster Cancer Foundation, a nonsectarian organization designed to educate the public about cancer risk factors. The campaign against smoking, particularly the efforts of the nursing profession, is described and future programs are outlined.

86-0727. Cann, C.I.; Fried, M.P.; Rothman, K.J. **Epidemiology of Squamous Cell Cancer of the Head and Neck.** *Otolaryngologic Clinics of North America* 18(3):367-388, August 1985.

Epidemiological evidence implicating tobacco and alcohol use, occupational exposures, and radiotherapy and radioisotopes as risk factors for squamous cell cancer of the head and neck is reviewed. Tobacco appears to be a risk factor for most cancers originating in the head and neck region: the oral cavity, pharynx, esophagus, and larynx. Increased oral cancer risk is associated with all forms of tobacco use including cigarette, cigar, and pipe smoking, and snuff and tobacco chewing; risks increase with increasing amount and duration of tobacco use. There is conclusive evidence that combined use of tobacco and alcohol increases the risk for cancer of the aerodigestive tract. Tobacco apparently acts as an initiator and a promoter, since relative risk decreases after cessation of smoking. Although of less significance, clinical observation and epidemiological studies have also identified ionizing radiation and occupational exposures as factors in development of head and neck cancer. Diet also appears to play a role in cancer development, as nutritional deficiencies have been found to increase risk. The incidence of head and neck cancer in the United States, relative survival rates, and histopathology are also discussed.

86-0728. Chung, F.-L.; Wang, M.; Carmella, S.G., et al. **Effects of Butylated Hydroxyanisole on the Tumorigenicity and Metabolism of *N*-Nitrosodimethylamine and *N*-Nitrosopyrrolidine in A/J Mice.** *Cancer Research* 46(1):165-168, January 1986.

The effects of butylated hydroxyanisole (BHA) on *N*-nitrosodimethylamine (NDMA) and *N*-nitrosopyrrolidine (NDYR) tumorigensis and metabolic activation were investigated in lungs of female A/J mice. Mice were maintained on standard diets supplemented with 5 mg/g BHA for 1 week prior and during 10 weeks of treatment with NDMA or NPYR administered in drinking water. BHA inhibited NDMA tumorigenesis but enhanced NPYR tumorigenesis, reflected by lung adenoma counts 20 weeks after nitrosamine treatment. Treatment with BHA for 3 weeks increased whole lung microsomal α-hydroxylation of NDMA and NPYR, measured by aldehyde production, and increased lung and hepatic glutathione-S-transferase activities. No evidence was found for formation of S-methylglutathione in incubations with NDMA and hepatic supernatants obtained from BHA-treated or control mice. Four hours after gavage of NDMA, levels of 7-methylguanine in lung DNA of mice treated with BHA were higher than in lung DNA of control mice, but levels of O^6-methylguanine were similar in the two groups. Results indicate that BHA treatment increases microsomal metabolic α-hydroxylation of both NDMA and NPYR, but has differential effects on their tumorigenicity. (Auth. Abs. Mod.)

86-0729. Curtis, R.E.; Boice, J.D., Jr.; Kleinerman, R.A., et al. **Summary: Multiple Primary Cancers in Connecticut, 1935-82.** In: Greenwald, P.; Weisburger, E.K.; Aaronson, S.A., et al. (Editors). *Multiple Primary Cancers in Connecticut and Denmark.* U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute Monograph No. 68, NIH Publication No. 85-2714, December 1985, pp. 219-242.

Common environmental exposures seemed responsible for excess occurrence of many secondary cancers, particularly those related to cigarette smoking, alcohol consumption, or both, in a 47-year summary of multiple primary cancers. Risk of developing a second primary cancer was evaluated in more than 250,000 persons reported to the Connecticut Tumor Registry (CTR) between 1935 and 1982. Persons with initial cancer of the oral cavity, pharynx, or esophagus were at highest risk for developing a new primary cancer, especially for cancers of the lung, larynx, oral cavity, pharynx, and esophagus related to multiplicative effects of tobacco and alcohol. These persons experienced a more than tenfold excess of second cancers involving the oral cavity, pharynx, or esophagus and a threefold increase in respiratory cancers. Second primary cancers of the oral cavity frequently developed within the same anatomical or contiguous tissue as the initial cancer, reflecting the tendency of these cancers to be multifocal. Patients with initial cancers of the lip, larynx, and lung experienced more moderate risk at sites directly exposed to tobacco (relative risk, 1.5 to 3.7). Excess of esophageal cancer following laryngeal cancer was attributed to alcohol consumption and tobacco smoking. Excess risks of smoking- and alcohol-related cancers generally persisting for 10 or more years were usually higher in women than in men, and appeared in both directions (e.g., tongue cancer risk was increased after esophageal cancer and esophageal cancer after cancer of the tongue). (Auth. Abs. Mod.)

86-0730. Curtis, R.E.; Hoover, R.N.; Kleinerman, R.A., et al. **Second Cancer Following Cancer of the Female Genital System in Connecticut, 1935-82.** In: Greenwald, P.; Weisburger, E.K.; Aaronson, S.A., et al. (Editors). ***Multiple Primary Cancers in Connecticut and Denmark.*** U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute Monograph No. 68, NIH Publication No. 85-2714, December 1985, pp. 113-137.

Smoking as an etiologic factor for second primary cancer was investigated in more than 25,000 women with cancer of the genital organs diagnosed between 1935 and 1982 in Connecticut. Significant excesses of subsequent cancers were observed following cancers of the cervix (35 percent, n=656), uterine corpus (16 percent, n=1,060), and ovary (58 percent, n=366). Excesses became 40, 30, and 59 percent, respectively, when observed and expected second cancers of the female genital tract were excluded. Cancers related to smoking, i.e., oral cavity and pharynx, esophagus, and respiratory system, were notably increased among cervical cancer patients. The twofold to threefold risk observed for second cancers, consistent with recent evidence linking cervical cancer to cigarette smoking, appear too large to be an artifact of confounding by low socioeconomic status. Among women with cancer of the cervix or uterine corpus, the risk of second cancer rose with increasing length of followup, reaching an excess of 61 and 34 percent, respectively, after 20 years. Among ovarian cancer patients, however, second cancer risk decreased over time to 41 percent after 10 years.

86-0731. Dodds, L.; Davis, S.; Polissar, L. **A Population-Based Study of Lung Cancer Incidence Trends by Histologic Type, 1974—81.** *Journal of the National Cancer Institute* 76(1):21-29, January 1986.

All microscopically confirmed cases of lung cancer diagnosed between 1974 and 1981 in western Washington State were identified through the Surveillance, Epidemiology, and End Results Program. Incidence by histologic type was studied in relation to time, taking into account age, sex, and stage of disease at diagnosis. Observed increases in incidence of adenocarcinoma in both sexes suggest that a combination of cigarette smoking and other environmental or occupational exposures may be etiologically related to adenocarcinoma. Incidence of adenocarcinoma has increased significantly since 1974 in both sexes, but the increase has been greater among women: 86 percent in women and 54 percent in men. Most of the increase in both sexes was among those over 65 years of age, with distant or unstaged disease at diagnosis. Similar patterns were not observed for squamous cell carcinoma. In addition to the etiologic implications of trends, the potential effects of changes in diagnostic procedures and pathologic practices during the study period are explored. (Auth. Abs. Mod.)

86-0732. Flick, D.A.; Gonzalez-Rothi, R.J.; Harris, J.O., et al. **Rat Lung Macrophage Tumor Cytotoxin Production: Impairment by Chronic *In Vivo* Cigarette Smoke Exposure.** *Cancer Research* 45(11, Part 1):5225-5229, November 1985.

Results suggest that cigarette smoke exposure may impair pulmonary macrophage-mediated tumor defense mechanisms. Cultures of macrophages were derived from pulmonary lavage cells and stimulated in vitro with bacteria-derived lipopolysaccharide (LPS). Cytotoxin production was assayed in vitro using an L-929 cell target assay. After LPS stimulation, cytotoxin production peaked within 10 hours and thereafter plateaued. LPS doses >0.1 μg/mL were optimal for production, and in the absence of LPS, no cytotoxin was detected. Because cigarette smoke is the major etiological factor in development of lung cancers and is known to profoundly alter function of alveolar macrophages, subsequent experiments examined the role of chronic cigarette smoke exposure on tumoricidal activity of lung macrophages. Rats were exposed in vivo for 8 weeks to either cigarette smoke or air (sham-treated controls). When lavage cells were cultured and stimulated with LPS (1 μg/mL), fivefold to tenfold less cytotoxin was produced by lavage cells from rats exposed to cigarette smoke. Similarly, using a direct cytotoxicity assay, lung macrophages of smoke-exposed animals also revealed marked impairment in cytotoxicity against L-929 cell targets, which was noted over a wide range of macrophage to tumor target cell ratios. Interferon, another product of macrophages, was also lower in smoked-exposed rats than in sham-treated controls. (Auth. Abs. Mod.)

86-0733. Greene, M.H.; Wilson, J. **Second Cancer Following Lymphatic and Hematopoietic Cancers in Connecticut, 1935-82.** In: Greenwald, P.; Weisburger, E.K.; Aaronson, S.A., et al. (Editors). ***Multiple Primary Cancers in Connecticut and Denmark.*** U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute Monograph No. 68, NIH Publication No. 85-2714, December 1985, pp. 191-217.

Tobacco smoking as a possible risk factor for second primary cancer of the lung or kidney was evaluated in approximately 19,000 persons with initial cancers of the lymphatic and hematopoietic system in Connecticut between 1935 and 1982. Overall, significant excesses for all second cancers were observed among patients with leukemia (34 percent), Hodgkin's disease (70 percent), non-Hodgkin's lymphoma (25 percent), and multiple myeloma (24 percent). Patients with leukemia experienced significant excesses of cancers of the lung, kidney/ureter, and prostate. Patients with Hodgkin's disease displayed significant excesses of cancers of the buccal cavity and pharynx, lung, female breast, and thyroid. Among patients with non-Hodgkin's lymphoma, there were excess cancers of the stomach, lung, brain, and connective tissue, while those with multiple myeloma experienced a significant excess of acute nonlymphocytic leukemia. Analytic epidemiologic studies are needed to clarify the contributions of host susceptibility, smoking, immune dysfunction, and various forms of anticancer therapy to the specific second cancer excesses observed in persons with lymphoid and hematopoietic cancer. (Auth. Abs. Mod.)

86–0734. Hecht, S.S. **Chemical Carcinogenesis: An Overview.** *Clinical Physiology and Biochemistry* 3(2/3):89-97, 1985.

Relationship between human exposure to tobacco-specific nitrosamines and development of tobacco-related cancers is discussed in an overview of chemical carcinogenesis. Relatively high levels of tobacco-specific nitrosamines (carcinogens formed by nitrosation of tobacco alkaloids) are present in unburned tobacco and tobacco smoke. Although 1 mg of the nicotine-derived nitrosamine 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) can induce respiratory tract tumors in Syrian golden hamsters, their role in induction of tobacco-related cancers (i.e., lung, larynx, esophagus, pancreas, and bladder) in smokers is difficult to assess because of the complex mixture of carcinogenic, promoting, and cocarcinogenic compounds in tobacco smoke. Tobacco-specific nitrosamines are the only known carcinogens found in ppm concentrations in snuff tobacco and therefore may be major causative factors in cancer of the oral cavity induced by chewing tobacco and snuff. Epidemiological studies showed that snuff-dippers were four times more likely to develop oral cavity cancer than controls. Human oral and bronchial tissues can metabolize tobacco-specific nitrosamines to DNA-binding species, and the formation of O^6-methylguanine has been noted in tissues of animals treated with NNK, thus linking nicotine with induction of a promutagenic lesion in DNA. New sensitive methods being developed for assessing tobacco-specific nitrosamine metabolite levels and DNA adducts in tobacco smokers and chewers may be useful in identifying individuals most susceptible to induction of tobacco-related cancers.

86–0735. Jacobi, W.; Paretzke, H.G.; Schindel, F. **Lung Cancer Risk Assessment of Radon Exposed Miners on the Basis of a Proportional Hazard Model.** In: Stocker, H. (Editor). *Occupational Radiation Safety in Mining.* Proceedings of the International Conference, Toronto, Canada, October 14-18, 1984, Volume 1. Canadian Nuclear Association, 1984, pp. 17-24.

All epidemiological studies on radiation-induced lung cancer indicate that the observed age distribution of lung cancer rate is similiar to the expected rate without radiation. On the basis of this finding, a proportional hazard model for the age-specific lung cancer rate as a function of radon exposure was designed that also took into consideration the influence of smoking, using observed correlations between smokers and nonsmokers in the general population. The compatibility of the model with epidemiological findings among uranium miners in Czechoslovakia and the United States was assessed and results are presented. The derived relationships between lung cancer frequency, exposure, age, and followup time agreed with observed data for uranium miners. It is concluded that the proportional hazard model enables a prediction of lifetime lung cancer risk for different occupational exposure conditions without further assumptions. (Auth. Abs. Mod.)

86–0736. Jensen, O.M.; Knudsen, J.B.; Sorensen, B.L. **Second Cancer Following Cancer of the Urinary System in Denmark, 1943-80.** In: Greenwald, P.; Weisburger, E.K.; Aaronson, S.A., et al. (Editors). *Multiple Primary Cancers in Connecticut and Denmark.* U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute Monograph No. 68, NIH Publication No. 85-2714, December 1985, pp. 349-360.

The relationship between smoking and risk of second primary cancer was evaluated in 29,128 patients who developed tumors of the urinary tract (including benign and malignant tumors of the renal pelvis and ureter and bladder papillomas) in Denmark between 1943 and 1980. Among 9,162 persons with kidney cancer, 416 developed a second primary tumor (relative risk (RR) = 1.4). Among 19,966 persons with bladder cancer, 1,423 developed a second primary tumor (1,239 expected, RR = 1.1). Tobacco smoking, particularly cigarettes, is considered the most important risk factor associated with urothelial-derived tumors, cancers arising from the kidney parenchyma, and bladder cancer. However, it is noted that no increased risk was observed for cancer of the respiratory tract among persons with kidney tumors including the ureter and renal pelvis. Among bladder cancer patients, smoking-related increased risk of cancers of the lung (RR = 1.6) and larynx (RR = 1.5) was observed for males.

86–0737. Kantor, A.F.; McLaughlin, J.K. **Second Cancer Following Cancer of the Urinary System in Connecticut, 1935-82.** In: Greenwald, P.; Weisburger, E.K.; Aaronson, S.A., et al. (Editors). *Multiple Primary Cancers in Connecticut and Denmark.* U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute Monograph No. 68, NIH Publication No. 85-2714, December 1985, pp. 149-159.

The role of smoking in the development of second primary cancer is discussed in an evaluation of the risk of second primary cancer in persons in Connecticut who developed cancer of the urinary tract during 1935 to 1982. A second cancer was reported in 1,151 (9 percent) of 12,384 patients with a first primary tumor of the bladder or urethra. A significantly elevated relative risk (RR) of 1.23 was due in part to excess cancers of the lung and larynx, an occurrence that is consistent with the effect of cigarette smoking. Among 5,115 persons with a first primary tumor of the kidney, renal pelvis, or ureter, a second cancer was reported in 374 (7 percent), yielding a significantly elevated RR of 1.54 owing to excess tumors of the bladder and prostate and second primary kidney neoplasms. A greatly increased risk of bladder cancer following kidney cancer is thought to be partially due to cigarette smoking and other shared risk factors. A nonsignificant increase in lung cancer following kidney cancer may be related to the impact of cigarette smoking on both tumors, but the occurrence of pulmonary metastases cannot be ruled out with the present data.

86–0738. Keast, D.; Tam, N.; Sheppard, N., et al. **The Role of Tobacco Smoke, Iron Ore Mine Dusts, Viruses, and Chemicals in Experimental Cancer.** *Archives of Environmental Health* 40(6):296-300, November-December 1985.

Assessment of long-term studies on the carcinogenic potential in animal models of tobacco smoke inhalation, implantation and inhalation of the respirable fraction of iron ore mine dusts, acute neonatal reovirus 3 infection, urethane, and tobacco smoke inhalation following urethane treatment indicates that these agents tend to activate and/or promote tumors inherent to the host strains of animals used, regardless of the extent of additional immunological modulation. This suggests that results from such models are biased, since in animals genetically programmed to normally develop only one tumor type, exposure to tobacco smoke and other environmental agents will lead mainly to an enhanced expression of only that major strain-specific tumor. It is suggested that these environmental agents function at the onc-gene level, promoting a tumor type normally seen only in later life, thus implicating the agents as tumor promotors/activators rather than as carcinogens. Future research should concentrate on determining whether tobacco smoke and other environmental agents function in similar ways to activate and/or promote inherent tumors or if each agent proceeds through a different mechanism to activate an inherent onc-gene. This may lead to classifying some environmental agents according to their activating or promoting potential rather than by carcinogenic potential. (Auth. Abs. Mod.)

86–0739. Kew, M.C.; Dibisceglie, A.M.; Paterson, A.C. **Smoking as a Risk Factor in Hepatocellular Carcinoma. A Case—Control Study in Southern African Blacks.** *Cancer* 56(9):2315-2317, November 1, 1985.

Results indicate that the 240 southern African black patients with hepatocellular carcinoma (HCC) were not more likely to smoke or smoke heavily than the 240 controls matched for race, sex, age, and urban or rural background. This was also true when patients were divided into subgroups: men and women and urban and rural background. A slightly increased relative risk was associated with smoking in all patients with no serum markers of current or past hepatitis-B virus infection and in patients over 50 years of age who did not have these infection markers. However, this was not statistically significant and was not supported by a linear trend (the risk in heavy smokers being less than 1). Rural black patients, who have a higher incidence of HCC than urban black patients, smoked less than their urban counterparts. It is concluded that smoking is not an unqualified risk factor for HCC in southern African black patients. However, smoking may play an etiologic role in patients without hepatitis-B infection, especially in older people. (Auth. Abs. Mod.)

86–0740. La Vecchia, C.; Franceschi, S.; Decarli, A., et al. **Cigarette Smoking and the Risk of Cervical Neoplasia.** *American Journal of Epidemiology* 123(1):22-29, January 1986.

The risk of cervical neoplasia associated with cigarette smoking increased with number of cigarettes smoked and with smoking initiation at a young age. The relationship between cigarette smoking and risk of cervical neoplasia was evaluated in a case—control study of 183 women with cervical intraepithelial neoplasia compared with 183 age-matched outpatient controls, and of 230 cases of invasive cervical cancer compared with 230 hospitalized controls with acute conditions unrelated to any of the identified or suspected risk factors for cervical cancer. Relative risk of intraepithelial neoplasia was elevated within 20 years after smoking initiation and showed little tendency to increase with increasing duration. Risk of invasive cervical cancer was apparently unaffected by smoking less than 20 years and increased steadily thereafter, risk reaching 3.63 after 40 years or more of smoking. Relative risks are presented according to smoking habits and number of cigarettes smoked/day, smoking status, selected covariates (age, social class, education, age at first intercourse, number of sexual partners, number of live births, and number of screening smears), duration of smoking, and age at smoking initiation. (Auth. Abs. Mod.)

86–0741. LaVoie, E.J.; Shigematsu, A.; Rivenson, A., et al. **Evaluation of the Effects of Cotinine and Nicotine-*N*′-oxides on the Development of Tumors in Rats Initiated With *N*-(4-(5-Nitro-2-furyl)-2-thiazolyl)formamide.** *Journal of the National Cancer Institute* 75(6):1075-1081, December 1985.

The tumor-promoting effects of cotinine, trans-nicotine-*N*′-oxide, and a mixture of trans- and cis-nicotine-*N*′-oxides were investigated in urinary bladders of F344 rats initiated with *N*(4-(5-nitro-2-furyl)-2-thiozolyl)formamide (FANFT). FANFT was administered in an agar diet for 6 weeks beginning when rats were 6 weeks old. The nicotine metabolites were then administered in concentrations of 0.1, 0.02, and 0.02 percent, respectively, in drinking water for 78 weeks beginning 6 weeks after the final FANFT administration. Cotinine, trans-nicotine-*N'*-oxide, and the mixture of cis- and trans-nicotine-*N'*-oxides were neither carcinogens nor promoters of urinary bladder tumors in rats initiated with FANFT. Reduced incidence of urinary bladder tumors was observed in FANFT-pretreated animals that also received a mixture of cis- and trans-nicotine-*N'*-oxides. However, there was a significant increase in incidence of forestomach tumors in rats that were initiated with FANFT and subsequently received either trans-nicotine-*N'*-oxide or a mixture of cis- and trans-nicotine-*N'*-oxides. (Auth. Abs. Mod.)

86–0742. Li, F.P.; Jamison, D.S.; Meadows, A.T. **Questionnaire Study of Cancer Etiology in 503 Children.** *Journal of the National Cancer Institute* 76(1):31-36, January 1986.

Genetic and environmental factors (including prenatal influences such as maternal smoking) in the development of cancers in children were investigated from etiologic questionnaire responses. Questions regarding the gestational period focused on occupational exposures of each parent, maternal illnesses, and use of medications and tobacco. Mothers of 154 of 456 index children smoked cigarettes during pregnancy. Rates of maternal smoking did not differ significantly by tumor type among patients ($p > .05$). Birth weights confirmed that mothers who smoke during pregnancy tend to bear smaller children: birth weight of less than 6 pounds was reported for 10 percent of children whose mothers smoked compared with 4 percent of those whose mothers did not smoke. Among 1,123 siblings of patients, 10 developed cancer compared with 2 expected, based on cancer rates for the general population. Cancer risk factors were identified in individual patients with predisposing genetic and congenital disorders: neurofibromatosis (brain tumor), hereditary immunodeficiency (lymphoma), Down's syndrome (leukemia), XY gonadal dysgenesis (germ cell tumor), giant nevus (melanoma), and meningocele (sacral teratocarcinoma). Environmental causes of childhood cancer were difficult to discern because prior exposures were numerous, diverse, and usually ill defined. (Auth. Abs. Mod.)

86–0743. Lipkin, A.; Miller, R.H.; Woodson, G.E. **Squamous Cell Carcinoma of the Oral Cavity, Pharynx, and Larynx in Young Adults.** *Laryngoscope* 95(7, Part 1):790-793, July 1985.

Squamous cell carcinoma in young people may be related to heavy smoking and drinking. Poor survival in many such patients is the result of self-neglect and failure to seek medical care early in the course of the disease. Of the 34 men and 5 women studied, who ranged in age from 28 to 40 years (mean age 36.3 years), 26 were black, 12 were white, and 1 was a Latin American. All were heavy cigarette smokers, averaging 40 pack-years, and 25 were classed as alcoholics. Patients were diagnosed as having squamous cell carcinoma of the head and neck (excluding nasopharyngeal carcinoma). Lesions of the oral cavity and oropharynx were most frequent, followed by laryngeal lesions. Four patients had second primary tumors and one patient had three lesions. Only eight had cancers small enough to be considered curable by radiotherapy or organ-sparing surgery. Of the remaining tumors, 26 required radical surgery and 8 were considered incurable. In three cases, the patients left the hospital before treatment could be initiated. In several other cases, lack of patient compliance delayed treatment for up to 6 months. Of 30 patients for whom information was available for followup more than a year after treatment, 19 had died. (Auth. Abs. Mod.)

86–0744. Mack, T.M.; Yu, M.C.; Hanisch, R., et al. **Pancreas Cancer and Smoking, Beverage Consumption, and Past Medical History.** *Journal of the National Cancer Institute* 76(1):49-60, January 1986.

Cigarette smoking was a strong and consistent predictor of pancreas cancer in 490 patients who were compared with controls matched by age, sex, race, and neighborhood in a Los Angeles study. Daily dose, duration of smoking, and (in ex-smokers) interval since cessation were determined. Ex-smokers who quit smoking more than 10 years before diagnosis were not at increased risk, despite former daily dose or duration of use. More recent quitters had a level of risk nearly as high as that of current smokers. For men, relative risk (RR) estimates for current smokers of a pack/day were 5.3 in 124 directly interviewed pairs and 1.8 in all pairs; for ex-smokers, RR was 1.2 and 1.2, respectively. For women who smoked a pack/day, RR estimates were 6.0 and 2.9, and for ex-smokers (≥ 10 years), 0.8 and 0.9, respectively. Interaction of current or recent smoking with beverage consumption showed that the effect of smoking, present within each beverage—dose stratum, was generally stronger for women than for men. Effect of smoking was apparent also within each stratum of beef consumption, but no residual effect of diet was seen. There was no link found between pancreas cancer and past consumption of tea, carbonated beverages, beer, or alcohol, and the association with coffee consumption was inconsistent. A strong association between pancreas cancer and history of subtotal gastrectomy at any past time could not be explained by chance or any other factor. (Auth. Abs. Mod.)

86–0745. Marrett, L.D.; Meigs, J.W.; Flannery, J.T. **Bladder Cancer in Connecticut: The Role of Cigarette Smoking and Other Risk Factors.** *Connecticut Medicine* 49(11):718-726, November 1985.

Cigarette smoking was associated with bladder cancer in 57 percent of men and 27 percent of women in a case—control study investigating risk factors. Based on interviews of 412 persons with newly diagnosed bladder cancer (identified through the Connecticut Tumor Registry network) and 881 controls of similar sex and age distribution, cigarette smokers had significantly elevated odds ratios (OR) compared with nonsmokers: 2.8 ($p < 0.01$) and 1.8 ($p < 0.05$) in males and females, respectively. Risk increased according to amount smoked from 2.2 ($p < 0.01$) in male smokers of less than 20 pack-years (compared with nonsmokers) to 3.7 ($p < 0.01$) in male smokers of 40 or more pack-years. Comparable ORs for women were 1.5 and 3.7 ($p<0.01$), respectively. Risks were also elevated in both sexes for consumption of more than one cup of coffee/day, while occupational factors appeared to account for only a very small fraction of cases. It is recommended that more public attention be focused on cigarette smoking as a preventable exposure that could significantly reduce bladder cancer incidence. (Auth. Abs. Mod.)

86–0746. Meigs, J.W.; Marrett, L.D.; Ulrich, F.U., et al. **Bladder Tumor Incidence Among Workers Exposed to Benzidine: A Thirty-Year Follow-Up.** *Journal of the National Cancer Institute* 76(1):1-8, January 1986.

The contribution of cigarette smoking to excess bladder tumor incidence was investigated among 984 benzidine-exposed manufacturing workers employed at a single plant at any time between 1945 and 1965. Employment, exposure, and smoking history data are provided for the 48 first primary cancers reported to the Connecticut Tumor Registry for this cohort. Compared with findings for the Connecticut population, there was a statistically significant excess of bladder cancer among men in the cohort that was confined to those with the highest estimated level of benzidine exposure. Of the eight patients with bladder cancer, three were long-term cigarette smokers; however, smoking histories of the remaining five were unknown. Since the standardized incidence ratio (SIR) for lung cancer in those with high benzidine exposure was only 202, it is considered unlikely that the very high SIR observed for bladder cancer was due to smoking. Results suggest that major preventive measures instituted about 1950 may have reduced bladder cancer risk at the plant. (Auth. Abs. Mod.)

86–0747. Mendez, P., Jr.; Maves, M.D.; Panje, W.R. **Squamous Cell Carcinoma of the Head and Neck in Patients Under 40 Years of Age.** *Archives of Otolaryngology* 111(11):762-764, 1985.

Epidermoid carcinoma of the head and neck, studied in 63 patients under 40 years of age for predilection sites, responsible factors, and treatment results, revealed that younger patients had been less exposed to carcinogens than older groups. However, 57 percent reported a history of smoking (often from about 17 years of age). Malignancies occurred in the oral cavity (41 percent), pharynx (28 percent), larynx (25 percent), and other sites (6 percent). Patients were all white (41 men and 22 women) between the ages of 13 and 40. Only three patients had a significant history of alcohol consumption (>6 beers/day), while 36 consumed at least one pack of cigarettes/day. The majority (66 percent) reported no family history of cancer. Forty-six percent presented with a cervical mass, 31 percent with a painless oral lesion, and 27 percent with hoarseness. Squamous cell carcinoma of the head and neck, commonly regarded as a disease of patients in the sixth decade of life and after, is uncommon in patients under the age of 40 years. (Auth. Abs. Mod.)

86–0748. Michalek, A.M.; Cummings, K.M.; Pontes, J.E. **Cigarette Smoking, Tumor Recurrence, and Survival From Bladder Cancer.** *Preventive Medicine* 14(1):92-98, January 1985.

Cigarette smoking was not an important prognostic factor for patients with bladder cancer. Regression analysis using Cox's proportional hazards model evaluated the effect of smoking status, stage of disease at diagnosis, histology, race, sex, and age at diagnosis on tumor recurrence and length of survival of 302 bladder cancer patients (88 percent transitional cell tumors, 6 percent squamous cell tumors, and 6 percent unclassified. Current smokers (46 percent) were significantly younger than ex-smokers ($p<0.05$) and never smokers ($p<0.01$); ex-smokers (22 percent) were significantly younger than nonsmokers ($p<0.01$). Younger patients with less extensive disease and with transitional cell tumors had the best survival prognosis. Data on tumor recurrence (36 percent) in patients with localized disease showed that smoking status was not associated with either recurrence-free survival or number of tumor recurrences. The hypothesis that cigarette smoking contributes to a higher rate of tumor recurrence and poorer survival in patients with bladder cancer was not supported. (Auth. Abs. Mod.)

86–0749. Morrison, H.I.; Semenciw, R.M.; Mao, Y., et al. **Lung Cancer Mortality and Radiation Exposure Among the Newfoundland Fluorspar Miners.** In: Stocker, H. (Editor). *Occupational Radiation Safety in Mining.* Proceedings of the International Conference, Toronto, Canada, October 14-18, 1984, Volume 1. Canadian Nuclear Association, 1984, pp. 365-368.

Lung cancer related to cumulative radon daughter exposure, analyzed in 2,100 Newfoundland fluorspar miners, appeared to have a longer latency period in smokers than in nonsmokers, which is the opposite of findings in other studies. Overall latency was 25.9 years, and length of latency decreased with increasing age at first exposure. Although the latency period was longer for smokers, the difference (tested by a two-way analysis of variance) was not statistically significant. Assuming a linear model, and based on crude rates, data indicated that excess lung cancer deaths per million person-years/working level months increased with age at first exposure and varied between 5.5 and 6.0, depending on smoking status. It is noted that present findings, based on small numbers of nonsmokers in the cohort, are subject to considerable variability and should be viewed cautiously.

86–0750. Murphy, S.E.; Hecht, S.S. **Effects of Chronic Ethanol Consumption on Benzo(*a*)pyrene Metabolism and Glutathione S-Transferase Activities in Syrian Golden Hamster Cheek Pouch and Liver.** *Cancer Research* 46(1):141-146, January 1986.

Metabolism of benzo(*a*)pyrene (BaP) by hepatic or cheek epithelium microsomes obtained from Syrian golden hamsters was measured to investigate the hypothesis that alcohol acts as a cocarcinogen for carcinogens in tobacco smoke in development of oral cavity cancer. Hamsters were maintained on an ethanol-containing liquid diet. Metabolism of BaP to 4,5-dihydro-4,5-dihydroxybenzo(*a*)pyrene (BaP-4,5-diol),7,8-dihydro-7,8-dihydroxybenzo(*a*)pyrene (BaP-7,8-diol), 9-hydroxybenzo(*a*)pyrene (9-OH-BaP), and 3-hydroxybenzo(*a*)pyrene (3-OH-BaP) by hepatic microsomes from ethanol-consuming hamsters was significantly reduced (40 to 52 percent, $p<0.05$) compared with control microsomes. However, a twofold increase ($p<0.05$) in metabolism of BaP to BaP-7,8-diol and 9,10-dihydro-9,10-dihydroxybenzo(*a*)pyrene was measured with microsomes from cheek pouch epithelium of ethanol-consuming animals. No significant change was observed in production of BaP-4,5-diol, 9-OH-BaP, or 3-OH-BaP by cheek pouch epithelium of ethanol-consumers compared with controls. No difference in glutathione S-transferase activity of hepatic or cheek pouch epithelium cytosol between groups was observed toward 1-chloro-2,4-dinitrobenzene or (±)-r-7,t-8-dihydroxy-t-9,10-epoxy-7,8,9,10-tetrahydrobenzo(*a*)pyrene. Results suggest a metabolism by which ethanol might enhance BaP tumorigenesis in the hamster cheek pouch. (Auth. Abs. Mod.)

86–0751. Newell, G.R.; Lynch, H.K.; Carr, D.T. **Decreasing Lung Cancer Deaths Among Young Men in Texas.** *Texas Medicine* 81(9):29-31, September 1985.

A decline in cigarette smoking has contributed to decreases in lung cancer mortality in Texas among white and black men aged 35 to 44 and among white men aged 45 to 54. From 1970 to 1983, lung cancer mortality rates decreased from 14.0 to 13.7/100,000 and from 80.4 to 70.6/100,000 among white men in both age groups and from 34.9 to 17.4/100,000 among black men in the younger age group. For white men, yearly decreases in lung cancer mortality rates were 0.21 (overall decrease of 18.8 percent) and 0.98/100,000 (overall decrease of 14.4 percent). Black men aged 35 to 44 had a yearly decrease of 1.0/100,000 (39.0 percent overall). Mortality rates for black men aged 45 to 54 increased 1.17/100,000/year (10.3 percent overall). The rate of lung cancer mortality increase slowed dramatically among white men aged 55 to 74, indicating that a downturn in mortality rates among this group may be expected during the next 5 years. The observed trends are expected to continue as fewer men begin to smoke and more stop smoking.

86–0752. Olsen, J.H. **Second Cancer Following Cancer of the Respiratory System in Denmark, 1943-80.** In: Greenwald, P.; Weisburger, E.K.; Aaronson, S.A., et al. (Editors). *Multiple Primary Cancers in Connecticut and Denmark.* U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute Monograph No. 68, NIH Publication No. 85-2714, December 1985, pp. 310-324.

Second cancers following cancer of the respiratory system were most often attributed to common carcinogenic factors, including tobacco use, in a 37-year review of second cancer risk in approximately 36,000 persons reported to the Danish Cancer Registry from 1943 to 1980. An excess of tobacco-related cancers was found in the buccal cavity, bladder, larynx, liver, and kidney. Cancer of the cervix uteri (associated with smoking) and cancer of the uterine corpus (not linked with smoking) increased above expectation. Although cancer of the esophagus declined, significant excesses of pancreatic cancer were observed following cancers of the lung, larynx, and nasal cavities and attributed to either more careful medical surveillance or to common risk factors such as smoking. Risk of developing liver cancer after lung cancer was also significantly elevated. Although cigarette smoking was the major single cause of lung cancer in Denmark, industrial exposures (e.g., asbestos, radiation, chromium, nickel, polycyclic hydrocarbons) and air pollution have also been implicated as contributory factors. Elevated risks for sinonasal cancer were associated with smoking and exposure to nickel, wood dust, chromates, leather dust, and formaldehyde. (Auth. Abs. Mod.)

86–0753. Ruediger, H.W.; Nowak, D.; Hartmann, K., et al. **Enhanced Formation of Benzo(*a*)pyrene:DNA Adducts in Monocytes of Patients With a Presumed Predisposition to Lung Cancer.** *Cancer Research* 45(11, Part 2):5890-5894, November 1985.

Blood monocytes from 45 selected patients with lung cancer and 30 healthy controls were incubated with (*G*-^{3}H)-benzo(*a*)pyrene (BaP) for 30 hours, and formation of covalently bound DNA adducts was determined. Patients were either relatively young (under 46 years of age) nonsmokers or had at least one first-degree relative with lung cancer. Therefore, they might be considered cancer prone. DNA adducts were significantly elevated in 22 patients with early age cancer (4.34 fmol/μg DNA, $p<0.04$). In 12 familial cases, the slight elevation (2.77 fmol/μg DNA) was not statistically significant compared with healthy controls. BaP:DNA adduct levels did not differ significantly between smokers and nonsmokers, suggesting that overall activation to DNA binding metabolites was a constitutive process. Eight of nine lung cancer patients with DNA adducts equal to or above 4.5 fmol/μg of DNA, but only 16 of 36 with adducts below this value had either oat cell or squamous cell cancer ($p<0.05$). The observed enhanced formation of covalent DNA adducts in blood monocytes exposed to a carcinogenic polycyclic hydrocarbon may be genetically determined and could play a role in early development of lung cancer. (Auth. Abs.)

86–0754. Storm, H.H.; Jensen, O.M.; Ewertz, M., et al. **Summary: Multiple Primary Cancers in Denmark, 1943-80.** In: Greenwald, P.; Weisburger, E.K.; Aaronson, S.A., et al. (Editors). *Multiple Primary Cancers in Connecticut and Denmark.* U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute Monograph No. 68, NIH Publication No. 85-2714, December 1985, pp. 411-430.

Tobacco smoking appeared to underlie associations between multiple primary cancers of the oral cavity and pharynx, esophagus, respiratory system, and urinary tract in a 37-year study of multiple primary cancers in Denmark. The risk of developing a second primary cancer was studied among 171,749 men and 208,192 women reported to the Danish Cancer Registry between 1943 and 1980. Smoking also appeared to be associated with second primary cancers of the pancreas and cervix uteri. One-third of all 481 second tumors seen in lung cancer patients could be related to smoking, explaining the 20 percent excess of second primary cancer among lung cancer patients. Elevated relative risk of cancer at adjacent sites in oral cavity and pharynx cancers was attributed to tobacco and alcohol, as were the reciprocal associations between kidney and bladder cancers. Cancer of the cervix uteri was increased in women with initial cancers at smoking-related sites. Women with cervical cancer also had a higher risk of developing smoking-related cancers. (Auth. Abs. Mod.)

86–0755. Trichopoulos, D.; Sparos, L. **Smoking. (Letter).** *New England Journal of Medicine* 314(3):180, January 16, 1986.

It is suggested that primary hepatocellular carcinoma should have been included in a review of the health effects of smoking (*New England Journal of Medicine* 313(8):491-498, August 22, 1985; 313(9):555-561, August 29, 1985), because the liver is a likely natural target of tobacco carcinogens, given its metabolic role and existing data on experimental liver carcinogenesis. During the past 5 years, three independent case—control studies found an association between tobacco smoking and risk of primary hepatocellular carcinoma. This association appears to be independent of alcohol consumption and appears to interact additively with hepatitis B virus, the more established cause of primary hepatocellular carcinoma. Other studies have also shown an association between tobacco smoking and liver cancer. See also 86-0067, 86-0649.

86–0756. Vassallo, A.; Correa, P.; De Stefani, E., et al. **Esophageal Cancer in Uruguay: A Case—Control Study.** *Journal of the National Cancer Institute* 75(6):1005-1009, December 1985.

The possible association between consumption of tobacco, alcohol, and mate (a popular national drink) and esophageal cancer, a major public health problem in Uruguay (highest death rate in 46 countries) was investigated in 226 patients and 469 controls. Mate is an infusion of the herb *Ilex paraguariensis*, drunk at high temperature. All participants were interviewed at time of admission between 1979 and 1984. Males showed elevated risks of esophageal cancer associated with heavy tobacco (relative risk (RR) 10.8) and alcohol (RR 10.3) use; in females the independent effects of tobacco and alcohol were insignificant. Mate consumption had an independent effect in both males and females, with odds ratios of 6.5 and 34.6, respectively, for heavy users. Among moderate and heavy smokers, mate consumption carried increased relative odds of 10.1 and 7.1 for moderate users, and 21.1 and 23.7 for heavy users, suggesting a multiplicative effect for joint exposure to mate and tobacco. (Auth. Abs. Mod.)

86–0757. Walker, A.R.P. **Cancer of the Cervix. Some Aspects of Epidemiology, Screening, Risk Factors and Survival.** *South African Medical Journal* 68(5):316-320, August 1985.

Smoking appears to be an undeniable risk factor for cancer of the cervix (CC) among women who smoke heavily, based on a review of studies, with one investigation (Czechoslovakia) linking smoking to the highest risk for developing the disease. Relative risk for CC in smokers was 7.0 in the United Kingdom and 7.2 for Swedish women who smoked ≥ 15 cigarettes/day. Other risk factors include early age at first intercourse, low socioeconomic status, having multiple sex partners, being widowed or divorced, and having a husband who has had multiple sex partners. The modus operandi of cervical carcinogenesis is not known. The possible interaction between cigarette smoking and herpes virus infection has been suggested. Hypotheses suggest that CC may be caused by direct carcinogenic action of absorbed cigarette smoke and by immunosuppressant action of cigarette smoke. Screening using the Papanicolaou test has markedly reduced incidence and mortality rates, particularly in certain Scandinavian populations. In Western populations, 40 to 60 percent of patients survive for 5 years, depending on disease stage at diagnosis. Among those at stage I, 70 to 90 percent survive for 5 years or more, compared with only 0 to 25 percent of stage IV patients. (Auth. Abs. Mod.)

86–0758. Wright, A.A. **The Nature of the Epithelium Adjacent to Oral Squamous Carcinoma and the Relationship to Tobacco.** *Diastema* 12:5-9, 1984.

Although no specific feature was identified as a conclusive predictor of malignant potential, significant differences were found between 72 smokers and 8 nonsmokers in epithelium adjacent to oral squamous carcinoma. Heavier smoking appeared to worsen presentation and differentiation of squamous carcinoma. In patients with poorly differentiated lesions, 90 percent were heavy smokers. In those with well differentiated lesions, 16 percent were nonsmokers and 66 percent were heavy smokers. This represents a ratio of well to poorly differentiated lesions in heavy smokers of 2:1. Among nonsmokers, 63 percent had well differentiated lesions and none had poorly differentiated lesions ($p<0.00002$). Incidence of basal cell hyperplasia (87 percent of smokers and 25 percent of nonsmokers) was also highly significant, as was mild or no hyperplasia in 59 percent of heavy smokers and 100 percent of nonsmokers ($p<0.0001$). Squamous cell carcinoma occurred in a significantly lower age group in blacks than in whites, and the male to female ratio was significantly higher in blacks than in whites. There were no black male nonsmokers among the patients, while 66 percent of the black females were nonsmokers. Among white patients, 4 percent of the men and 13 percent of the women were nonsmokers.

86–0759. Yamamoto, A.; Hisanaga, A.; Ishinishi, N. **Comparative Study on the Carcinogenicity of *N*-Nitrosodiethylamine and Benzo(*a*)pyrene to the Lung of Syrian Golden Hamsters Induced by Intermittent Instillations to the Trachea.** *Cancer Letters* 25(3):271-276, January 1985.

N-Nitrosodiethylamine (NDEA) and benzo(*a*)pyrene (BaP) were intratracheally instilled into female Syrian golden hamsters 15 times/week for about 4 months (total dose 15 mg). Control hamsters were given phosphate buffer solution. All hamsters in the NDEA, BaP, and control groups died within 237, 443, or 614 days, respectively, after initial instillation. Tumor incidence rates in the NDEA and BaP groups were 100 percent and 46 percent, respectively; mean survival for tumor-bearing animals was 172 and 232 days, respectively. Differences were significant ($p<0.001$). No tumors occurred in the control group. NDEA hamsters had lung tumors (some squamous cell carcinoma), adenomas, and squamous tracheal papillomas; BaP-exposed hamsters had squamous cell carcinomas and tracheal papillomas. (Auth. Abs. Mod.)

See also, **86–0904, 86–0913, 86–0916, 86–0923, 86–0932, 86–0938, 86–0969, 86–0982**

NON—NEOPLASTIC RESPIRATORY DISEASES

86–0760. Bridges, R.B.; Kimmel, D.A.; Wyatt, R.J., et al. **Serum Antiproteases in Smokers and Nonsmokers. Relationships to Smoking Status and Pulmonary Function.** *American Review of Respiratory Disease* 132(6):1162-1169, December 1985.

Although cigarette smoking increased serum α_1-proteinase inhibitor (α_1-PI) concentration and total protease inhibitory capacity, no evidence was obtained to suggest that the functional activity of serum α_1-PI (against either trypsin or elastase) was directly affected by smoking. Activity of serum α_1-PI was investigated in 50 smokers and 50 nonsmokers matched for age and race. A 13.3 percent ($p=0.007$) increase in mean serum α_1-PI concentration was found in smokers, accompanied by increases in both serum trypsin inhibitory capacity (TIC, 9.9 percent, $p=0.002$) and elastase inhibitory capacity (EIC, 12.4 percent, $p=0.001$). A significant association of α_1-PI, TIC, and EIC with increased pack-years of smoking, plasma nicotine, and plasma cotinine concentrations showed that smoking increases serum α_1-PI concentration and total protease inhibitory capacity. Pulmonary function did not correlate with serum α_1-PI concentration; however, higher serum TIC and EIC did correlate with tests of small airways dysfunction. Highly significant correlations ($r\geq 0.6$, $p=0.001$) were observed between TIC (or EIC) and α_1-PI concentrations. Linear relationships between TIC (or EIC) and serum α_1-PI concentration were not significantly different in smokers and nonsmokers. No significant differential effect of smoking on either TIC or EIC could be demonstrated. An apparent decrease in functional activity of α_1-PI (i.e., nmol of protease inhibited/nmol of α1-PI) was associated with higher serum concentration, a phenomenon observed in both smokers and nonsmokers. (Auth. Abs. Mod.)

86–0761. Broder, I.; Corey, P.; Davies, G., et al. **Longitudinal Study of Grain Elevator and Control Workers With Demonstration of Healthy Worker Effect.** *Journal of Occupational Medicine* 27(12):873-880, December 1985.

Respiratory symptoms and pulmonary function of 441 grain elevator workers (51 percent smokers) were compared with 180 controls (civic workers) over a 3-year period. In the first survey (1977), smokers in all smoking categories showed less inclination to wear masks during grain handling. Over the 3-year period, grain handlers who smoked reported a decrease in rhinitis and an increase in sputum. Civic workers showed a comparable increase in sputum. Forced vital capacity (FVC), forced expiratory volume in 1 sec (FEV_1), and flow rates tended to decrease in all groups with the exception of current smokers among controls. Significant changes occurred among ex-smokers in both occupations: grain workers showed a decrease in FVC and forced expiratory flow at 50 percent of vital capacity (FEF_{50}); civic workers exhibited a decrease in FEV_1. A current smoker subgroup of grain workers showed a decrease in FVC and FEF_{75}; the comparable civic group had a decrease in FVC. In comparisons by occupational group and by smoking subgroup, grain workers consistently showed higher flow rates than civic workers, although the only significant differences were higher FEF_{75} among grain workers who were current smokers in 1977, and higher FEF_{75} among grain workers who were ex-smokers in the second survey (1980). The only significant differences within smoking subgroups was an increase in FEV_1/FVC of grain handlers who were ex-smokers and a decline in FEF_{75} of grain workers who were current smokers. (Auth. Abs. Mod.)

86–0762. Cantin, A.; Crystal, R.G. **Oxidants, Antioxidants and the Pathogenesis of Emphysema.** *European Journal of Respiratory Diseases* 66(Supplement 139):7-17, 1985.

It is suggested that oxidants associated with inflammatory cells and cigarette smoke can directly injure the alveolar walls and inactivate the defenses of the lower respiratory tract against neutrophil elastase, strongly suggesting a significant contribution of oxidants to the pathogenesis of emphysema. Cigarette smoking is associated with an accumulation in the lower respiratory tract of alveolar macrophages and, to a lesser extent, neutrophils, thus significantly increasing the burden of oxidants. One puff of smoke contains 10^{28} radicals, many of which have half-lives of 5 minutes or more. Smoking also stimulates accumulation of oxidant-releasing inflammatory cells (50 to 70 per alveolus, 82 percent macrophages and 17 percent lymphocytes). However, research indicates that oxidant-induced lung destruction produces fibrosis: emphysema results from the ability of oxidants to shift the elastase—antielastase balance in the lower lung. Cigarette smoke oxidizes the methionine residues in α_1-antitrypsin (α_1-AT), decreasing its elastase-binding capacity and leading to an acquired form of emphysema. In genetically α_1-AT deficient patients, smoking shortens the average life span by 10 to 15 years. The best way to reestablish a proper oxidant—antioxidant balance is to remove the source of oxidants, i.e., by cessation of smoking. Other (experimental) means include enhancing the antioxidant protection via endotoxin, exogenous vitamin E, catalase or superoxide dismutase, small molecules with free sulfhydryl groups, or recombinant DNA-created α_1-AT that has valine in place of methionine at its active site. Also discussed are oxidant—antioxidant interactions, and normal antioxidant protection in the lungs.

86–0763. Castellan, R.M.; Sanderson, W.T.; Petersen, M.R. **Prevalence of Radiographic Appearance of Pneumoconiosis in an Unexposed Blue Collar Population. (Letter).** *American Review of Respiratory Disease* 132(5):1139, November 1985.

In response to a concurrently published letter (*American Review of Respiratory Disease* 132(5):1139, November 1985), it is agreed that it has been demonstrated that smoking, age, and dust exposure contribute to prevalence of small irregular opacities in chest radiographs. However, in the study population in question, the group of eight individuals with small opacities (median reading $\geq 0/1$) had greater mean age and greater mean pack-years of smoking than the rest of the population. Seven of the eight had a median reading of only 0/1, a very low profusion generally accepted as negative with regard to presence of pneumoconiosis opacities. In the total study population of 1,422, 321 were over 45 years of age and 167 were smokers. Yet only one individual was found (57-year-old smoker) who was judged to have small irregular opacities with median profusion as high as 1/0. This profusion is generally accepted as probably positive with regard to small opacities having appearance of pneumoconiosis. Therefore, the conclusion is maintained that there is no evidence for a substantial smoking effect in absence of occupational exposure. A study of an older population may enhance the likelihood of finding such a smoking effect, should one exist. See also 86-0453.

86–0764. Clini, V.; Pozzi, G.; Ferrara, A. **Bronchial Hyperreactivity and Arterial Carboxyhemoglobin as Detectors of Air Pollution in Milan: A Study on Normal Subjects.** *Respiration* 47(1):1-10, 1985.

The influence of air pollution and smoking on health in Milan was studied in 47 smokers and 31 ex-smokers by spirometric and aspecific bronchial reactivity tests, and in 86 smokers, 50 ex-smokers, and 61 nonsmokers tested for carboxyhemoglobin (COHb) levels. Area of residence was also determined as being northeast (NE) Milan, which has the highest pollution (SO_2 levels), northwest (NW), southeast (SE), or southwest (SW) Milan, which has the lowest pollution. Although smokers had the poorest lung function values, only the difference in maximal mid-expiratory flow was statistically significant. Bronchial reactivity (distilled water provocation test) was highest in people from the NE district and lowest in those from the SW, but did not differ significantly between smokers and nonsmokers as a whole. A greater degree of hypoxemia was found in smokers and ex-smokers than in nonsmokers among 73 respiratory patients (PaO_2 of 77.5, 68.4, and 82.1, respectively) and 124 controls (PaO_2 of 67.01, 68.6, and 72.1, respectively). COHb levels in smokers were 4.1 and 4.43 percent, respectively. COHb values were highest in people from the NE area and lowest in SW residents (average, 3.93 and 2.26, respectively). In NE, SE, and NW residents, smokers had significantly higher COHb values than ex-smokers, who had higher values than nonsmokers. In the SW, however, COHb levels were equivalent in the three groups.

86–0765. Damonte, C.; de Nadon, J.; Scarpazza, G., et al. **Study of the Spontaneous Cough Under a Pharmacological Treatment and of the Cough Induced by a Non-Specific Bronchial Stimulation. A Simple Method of Cough Recording.** *Italian Journal of Chest Diseases* 39(4):223-229, July-August 1985.

Spontaneous cough and its evolution in 20 patients suffering from acute inflammation of the airways was studied following treatment with an antitussive medicine, while cough induced by nonspecific bronchial stimulation with ultrasonic mist was studied in 77 healthy smokers and 91 nonsmokers carrying out normal work activity. After mist inhalation, an average increase in airway resistance of 79.0 percent was observed in smokers (male and female) compared with 43.2 percent in nonsmokers. A marked average irritation of proximal airways was observed in both smokers and nonsmokers. The tussive response was also highest in smokers; an average cough count during stimulation of 33.7 was recorded in smokers compared with 25.6 in nonsmokers. There was no correlation between bronchial spasm induced by ultrasonic mist inhalation and tussive reaction induced by the same stimulating agent. In 46 subjects who reacted to mist inhalation (increase of at least 50 percent of baseline airway resistance), the average tussive reaction scored only 33.6±4.5 cough counts compared with 29.6±5.6 recorded in the population as a whole. (Auth. Abs. Mod.)

86–0766. Dosman, J.A. **Occupational Exposure and Cigarette Smoking: Respiratory Health Protection in the Workplace.** *Journal of Public Health Policy* 6(2):185-196, June 1985.

Data from a 3-year longitudinal study are presented to counter the argument that chronic airways obstruction in workers exposed to occupational environmental inhalants is mainly the result of smoking. Grain workers examined were 200 lifetime nonsmokers (11.8 ± 7.7 years of grain dust exposure) and 353 smokers (13.0 ± 9.0 years exposure, 18.0 ± 12.7 pack-years of smoking). Controls were 113 lifetime nonsmokers and 133 smokers (22.2 ± 12.9 pack-years of smoking). Significant effects of working with grain were found for forced vital capacity (FVC) and forced expired volume in 1 sec (FEV_1), with only weak interaction of smoking and dust. Similar occupational effects are cited for workers in the cotton industry, pulp and paper mills, coal mining, asbestos, silicotic gold mining, and farming. Mechanisms that may enhance lung disease with smoking and occupational exposure include additive and synergistic effects of tobacco smoke compounds with identical agents found in the workplace. Similarly, cigarette smoking on the job may transform workplace contaminants into more harmful agents. Industry is obligated to provide safe working environments and good employee health services. Government can help with regulations concerning threshold limits, health surveillance, and information. Workers can become knowledgeable in achieving safe working environments, better working practices, and lifestyle habits aimed at health protection.

86–0767. Dosman, J.A.; Bergstrom, K.; Clark, K., et al. **Peripheral Airways Function and Nonspecific Airways Reactivity in Cigarette Smokers.** *Chest* 89(1):45-48, January 1986.

Peripheral airways dysfunction among smokers appears to be divided into dysfunction associated with, or related to, airways reactivity, and dysfunction related to other factors. When increasing concentrations of inhaled aerosolized histamine acid phosphate were administered to 31 heavy cigarette smokers, forced expiratory volume in 1 sec (FEV_1) was not reduced in 19 (nonresponders, mean age 39.6 years, mean pack-years 25.5 ± 13.5). In the 12 responders (mean age 38.4 years, mean pack-years $23.0 < 10.5$), extrapolated provocation concentration of inhaled histamine required to reduce FEV_1 by 10 percent (PC_{10}) could be determined. Also measured were maximum expiratory flow volume curves with air and with a mixture of 80 percent helium and 20 percent oxygen (HeO_2) to determine percentage of increase in maximal flow at 50 percent vital capacity breathing HeO_2 compared with breathing air, and slope of phase III of the single breath oxygen test. In responders, PC_{10} ranged from 1.4 mg/mL to 10.2 mg/mL (mean 5.5 ± 3.3 mg/mL) and ΔV_{max50} ranged from 7.1 percent to 68.4 percent (mean 39.6 ± 18.3 percent). There was a significant positive correlation between PC_{10} and ΔV_{max50} ($p < 0.01$) and a significant negative correlation between PC_{20} and $\Delta N_2/L$ ($p < 0.01$). No differences were recorded between responders and nonresponders in mean values for lung function tests, allergy skin test, or symptoms. (Auth. Abs. Mod.)

86–0768. Eriksson, S.; Lindell, S.-E.; Wiberg, R. **Effects of Smoking and Intermediate α_1-Antitrypsin Deficiency (PiMZ) on Lung Function.** *European Journal of Respiratory Diseases* 67(4):279-285, October 1985.

Smoking and heterozygous α_1-antitrypsin deficiency (PiMZ) as risk factors for emphysema were assessed in 56-year-old men through lung function tests. When data were compared with tests made 6 years earlier, there was no increase in prevalence of clinical obstructive lung disease. There were 32 PiMZ heterozygotes (14 smokers) and 31 PiM controls (13 smokers), representing 81 percent of the initial series. Annual decline in forced expiratory volume in 1 sec (FEV_1) values in PiMZ nonsmokers did not differ from PiM controls (smokers and nonsmokers). In contrast, heterozygote smokers showed a significantly higher mean annual decrease in FEV_1 than heterozygote nonsmokers (75 mL and 40 mL/year, respectively). It is concluded that minor physiological abnormalities in PiMZ smokers may signal the development of emphysema, in that lung function is deteriorating more rapidly than in PiM subjects. However, results, although compatible with the protease theory, do not support the concept of premature, clinically important emphysema development in either PiMZ smokers or nonsmokers. (Auth. Abs. Mod.)

86–0769. Evers, H.; Herrmann, H.; Ohme, G. **Die Wertigkeit des Maximalen Exspiratorischen Flußß-Volumen-Diagramms in Einer Longitudinalstudie. [Valuation of the Maximal Expiratory Flow-Volume Curve in a Follow-up Study.]** *Zeitschrift fur Erkrankungen der Atmungsorgane* 165:134-142, May 1985, German.

The maximal expiratory flow-volume curve in a random population sample of a hydrogen chloride air-polluted area was measured, followed by reexamination 4 years later. Significant differences were found between smokers and nonsmokers and between persons with and without bronchitis. Lung function data correlated with tobacco consumption. There was no evidence to indicate that maximal expiratory flow rates were superior to conventional spirometric parameters (forced expiratory volume in 1 sec and forced vital capacity). (Auth. Abs. Mod.)

86–0770. Garabrant, D.H.; Bernstein, L.; Peters, J.M., et al. **Respiratory Effects of Borax Dust.** *British Journal of Industrial Medicine* 42(12):831-837, December 1985.

Borax dust appears to act as a simple respiratory irritant causing small changes in pulmonary function among heavily exposed smokers. The relationship of respiratory symptoms, pulmonary function, and abnormalities of chest radiographs to estimated exposures of borax dust was investigated in 629 actively employed borax workers (50 percent current smokers, 25 percent ex-smokers). In 93 percent, exposures ranged from 1.1 mg/m^3 to 14.6 mg/m^3. Symptoms of acute respiratory irritation (e.g., dryness of mouth, nose, or throat, dry cough, nose bleeds, sore throat, productive cough, shortness of breath, and chest tightness) were related to exposures of ≥ 4.0 mg/m^3. Symptoms of persistent respiratory irritation defined as chronic simple bronchitis were related to exposure among nonsmokers. Decreased forced expiratory volume in 1 sec was found among smokers who had heavy cumulative borax exposures ($\geq$80mg/m^3) but not among less exposed smokers or among nonsmokers. Radiographic abnormalities such as small linear and round opacities and pleural thickening were related to smoking, previous employment in cotton mills, and asbestos exposure, but not borax dust exposure. (Auth. Abs. Mod.)

86–0771. Gellert, A.R.; Perry, D.; Langford, J.A., et al. **Asbestosis. Bronchoalveolar Lavage Fluid Proteins and Their Relationship to Pulmonary Epithelial Permeability.** *Chest* 88(5):730-735, November 1985.

Levels of albumin and various immunoglobulins in serum and in bronchoalveolar lavage (BAL) fluid were determined in 28 men with asbestosis (14 smokers, 11 ex-smokers, 3 never smokers) and 11 control subjects. Also, half-time clearance of inhaled diethylene triamine pentacetate labeled with technetium-99m from the lungs (t1/2LB) was measured in 26 asbestosis patients and 31 nonsmoking controls. In BAL samples where immunoglobulins (Ig) were detected, mean IgG to albumin ratio was significantly lower in patients than in controls, but did not differ significantly between smokers and nonsmokers. Mean BAL to serum albumin ratio was significantly greater in patients than in controls, but did not differ with smoking habits. No significant differences were observed in IgA levels between patients and controls or between smokers and nonsmokers. However, significant differences were observed for t1/2LB values: 21.5 minutes in 12 smokers with asbestosis, 33.3 minutes in 14 nonsmokers with asbestosis, and 59.2 minutes in 31 normal nonsmokers. No correlations were found between t1/2LB and BAL protein levels and ratios.

86–0772. Hallett, J.S.; Jacobs, R.L. **Recurrent Acute Bronchitis: The Association With Undiagnosed Bronchial Asthma.** *Annals of Allergy* 55(4):568-570, October 1985.

Incidence of mild bronchial asthma was markedly increased in patients with a history of recurrent acute bronchitis compared with the general population, and study results indicate the need to investigate underlying causes, such as smoking. Forty-six consecutive patients with a history of chest colds were studied prospectively to determine if hyperreactive airways (mild bronchial asthma) was a concomitant entity. Mild bronchial asthma was diagnosed in 30 patients by history, physical examination, and routine spirometry, or by methacholine bronchial provocation. Approximately 50 percent had smoked the equivalent of >1 pack of cigarettes/day during the preceding 5 years. The percentage was higher than expected in the general population, a factor that may have had an influence on development of symptoms, especially since smoking is recognized as a trigger for reactive airway disease and a predisposing factor for respiratory tract infections. Smoking is also associated with denuding of ciliated epithelial cells, squamous metaplasia, decreased ciliary function, and decreased rates of mucus transport, all of which could affect the likelihood of infection. (Auth. Abs. Mod.)

86–0773. Hee, J.; Guillerm, R. **Discussion on Smoke and Mucociliary Transport.** *European Journal of Respiratory Diseases* 66(Supplement 139):86-88, 1985.

Tobacco smoke contains many components (including hydrocyanic acid, formaldehyde, acrolein, acetaldehyde, and phenol) in more than sufficient concentrations to reduce ciliary beat frequency by 50 percent. In vitro studies showed that a decrease of 20 and 50 percent in ciliary beat frequency slowed mucus transport 34 and 70 percent, respectively. However, the discontinuous nature of smoke exposure means that smoke is diluted by tidal air by a factor of about 100. In addition, recovery of ciliary activity following acute exposure is almost immediate. The site of action also plays a role. The effects of smoke on ciliary function may be mediated through the blockage of thiol groups: smoke contains several substances capable of reacting with -SH groups that also inhibit enzymes containing this thiol group. There is a significant correlation between ciliary beat inhibition and the percentage of cysteine oxidized during contact with smoke, and smoke from nonfiltered cigarettes shows greater inhibitory activity. However, chronic mucociliary disorders are more likely connected with smoke-induced structural changes in the tracheobronchial mucosa.

86–0774. Kennedy, S.M.; Wright, J.L.; Mullen, J.B., et al. **Pulmonary Function and Peripheral Airway Disease in Patients With Mineral Dust or Fume Exposure.** *American Review of Respiratory Disease* 132(6):1294-1299, December 1985.

Occupational exposure to mineral dust and fume produced structural changes in peripheral airways that were greater than those seen with smoking alone, but the changes were not associated with greater deterioration in lung function. To determine if mineral dust or fume exposure in smokers results in additional changes in small airways structure and function, small airways disease and pulmonary function were studied in 25 persons (62.4±8.8 years of age) who had been exposed to mineral dust or fume for 10 years or more. Controls without dust exposure were matched for age (±3 years) and smoking history. All patients and controls were undergoing surgical resection for isolated coin lesions. Occupational histories and measurements of lung volumes, flow rates, small airways function, diffusing capacity, and pressure-volume relationships were obtained preoperatively. Membranous bronchioles were graded for presence and degree of mural inflammation, fibrosis, muscle, pigment, and squamous and goblet cell metaplasia. Respiratory bronchioles were similarly graded for inflammation, fibrosis, muscle, pigment, and lumenal macrophages. The dust-exposed group had increased fibrous tissue deposition and goblet cell metaplasia in the membranous bronchioles ($p<0.05$). When the exposed group was divided according to occupation into 13 miners and 12 nonminers exposed in other dusty jobs, pathologic changes were evident in both groups. No differences in pulmonary function were seen between the two groups. (Auth. Abs. Mod.)

86–0775. Kurgan, J. **Przydatnosc Oznaczania Obojetnosci Zamykania do Okreslania Stanu Czynnosciowego Obwodowych Drog Oddechowych u Chorych na Przewlekle Zapalenie Oskrzeli. [Determination of Closing Volume for Evaluation of Functional State of Peripheral Respiratory System in Patients Suffering From Chronic Bronchitis.]** *Polski Tygodnik Lekarski* 40(21):593-596, May 27, 1985, Polish.

Closing volume (CV), forced vital capacity (FVC), forced expiratory volume in 1 sec (FEV_1), maximal mid-expiratory flow rate (MMEF), and vital capacity (VC) were measured in 55 male smokers with chronic bronchitis to evaluate the functional status of their peripheral respiratory systems. Average age was 39.8 years and average cigarette smoking duration was 19.2 years. Total cigarette consumption averaged 100,702/person. Less than normal MMEF values were observed in 12 patients (21.2 percent) and increased CV/VC percent ratios were observed in 20 (36.3 percent). All patients with abnormal MMEF values also had increased CV/VC percent. Among the 35 men with normal CV/VC values (group A), average duration of chronic bronchitis was 3.6 years compared with 6.2 years for those with abnormal CV/VC percent values (group B). Group A patients had smoked an average of 77,040 cigarettes/person over a 16.5-year period compared with 132,250 cigarettes/person over a period of 22.1 years for group B patients. It is concluded that smoking intensity plays a significant role in development of diminished lung function associated with chronic bronchitis.

86–0776. Leuenberger, P.; Vonmoos, S.; Vejdovsky, R. **Morphologic Changes of Alveolar Macrophages in Smoking Sarcoidosis Patients.** *European Journal of Respiratory Diseases* 66(Supplement 139):72-75, 1985.

Cigarette smoke increases the number and alters the structure of alveolar macrophages of patients with sarcoidosis. Cell populations in bronchoalveolar lavage (BAL) fluids from 26 nonsmokers and 14 smokers suffering from pulmonary sarcoidosis were compared. Cell yield was significantly higher in smokers than in nonsmokers ($p<0.02$). Lavage fluids of smokers contained 83 percent of macrophages and 14 percent of lymphocytes compared with 60 percent and 34 percent, respectively, in nonsmokers ($p<0.002$). However, the total number of lymphocytes in each group was not significantly different. Alveolar macrophages from smokers were bigger and contained large pigmented lipoproteinic inclusions. Complementary cytochemical studies showed that lipofuscines were the principal constituent of the intracytoplasmic inclusions. (Auth. Abs. Mod.)

86–0777. Minty, B.D.; Royston, D. **Cigarette Smoke Induced Changes in Rat Pulmonary Clearance of ^{99m}TcDTPA. A Comparison of Particulate and Gas Phases.** *American Review of Respiratory Disease* 132(6):1170-1173, December 1985.

Pulmonary clearance of ^{99m}Tc diethylenetriamine pentaacetic acid (^{99m}TcDTPA) in rats exposed to 90 puffs of dilute whole cigarette smoke twice/day for 7 days was significantly increased, but returned to normal 3 weeks after exposure was terminated. Filtration of smoke to remove the particulate phase abolished effects on clearance. The noninvasive method used permitted frequent repeat measurements with a high degree of reproducibility. The weekly mean value for ^{99m}TcDTPA clearance from lungs of 10 rats ranged from 0.40 percent/min to 0.52 percent/min. The coefficient of variation for the 6-week period was 8.4 percent. Increased clearance ranged from mean baseline values of 0.48±0.04 percent/min to 1.28±0.17 percent/min ($p<0.001$). Three weeks after exposure, the mean value had fallen to 0.49±0.03 percent/min. The study, aimed at modeling chronic events reported in humans, suggests that cigarette smoking may allow easier access of autoantibody to the lung basement membrane, facilitating pulmonary injury and hemorrhage. (Auth. Abs. Mod.)

86–0778. Musk, A.W.; Peters, J.M.; Berstein, L. **Absence of Respiratory Effects in Subjects Exposed to Low Concentrations of TDI and MDI: A Reevaluation.** *Journal of Occupational Medicine* 27(12):917-920, December 1985.

Subjects exposed to low concentrations (0.0010 to 0.0015 ppm) of toluene diisocyanate (TDI) and (0.0003 to 0.0006 ppm) diphenylmethane diisocyanate (MDI) showed normal decline in age- and smoking-related forced expiratory volume in 1 sec (FEV_1), with no evidence that the decline was related to isocyanate exposure. Pulmonary function in 259 workers exposed to TDI and MDI were measured in 1971 and again in 1976 under spirometry standards promulgated by the American Thoracic Society. FEV_1 declined at a faster rate in smokers than in nonsmokers and ex-smokers, and smokers had a tendency to lower levels of pulmonary function than nonsmokers in the general population. However, the effect of smoking was unrelated to isocyanate exposure. This reanalyzation, which followed criticisms of a previous report, confirms earlier results and conclusions. (Auth. Abs. Mod.)

86–0779. Paggiaro, P.L.; Viegi, G.; Fielieri, M., et al. **Fonction Pulmonaire et Pathologie Respiratoire Chez 40 Ouvrieres Exposees Depuis Longtemps aux Poussieres de Tabac. [Pulmonary Function and Respiratory Pathology in 40 Workers After Prolonged Exposure to Tobacco Dust.]** *Revue Francaise des Maladies Respiratoires* 11(4):495-496, 1983, French.

The occurrence of respiratory diseases and pulmonary function alterations was investigated in 40 women (aged 57.5±1.7 years) employed in a tobacco processing plant. Duration of exposure to tobacco dust was 37.4±1.9 years. Mean consumption of the 17 smokers was 9.4±7.0 pack-years. Dyspnea, sibilants, and asthma, noted in 40, 22, and 12 percent, respectively, were observed more frequently in smokers. Vital capacity values were normal in all subjects; however, forced expiratory flow (between 25 and 75 percent and 75 and 85 percent of forced vital capacity) values were significantly lower than predicted. Values for carbon monoxide transfer were significantly lower in smokers than in nonsmokers. Other respiratory function parameters measured were also reduced in smokers compared with nonsmokers. Impaired respiratory function observed was attributed to obstruction of small airways induced by prolonged tobacco dust exposure. The small differences observed between smokers and nonsmokers were attributed to the relatively low tobacco consumption of smokers.

86–0780. Paoletti, P.; Camilli, A.E.; Holberg, C.J., et al. **Respiratory Effects in Relation to Estimated Tar Exposure From Current and Cumulative Cigarette Consumption.** *Chest* 88(6):849-855, December 1985.

Estimated tar exposure from current and past cigarette consumption was related to respiratory symptoms and function in an epidemiological study of obstructive airway diseases. Flow volume maneuvers were performed by 582 smokers (280 men) and 621 ex-smokers (345 men) who also completed questionnaires on current and past smoking habits. Cough and phlegm were significantly associated with estimated tar exposure from current cigarette consumption. Cough, phlegm, and dyspnea were associated with reported deep inhalation in both sexes; an association with wheeze was found in females. In young smokers (< 35 years), symptoms were more prevalent in those who had generally smoked high-tar cigarettes. Total exposure was more important in older smokers. Generally, ex-smokers had a lower prevalence of symptoms than smokers. Cross-sectional lung function measurements were significantly related to total estimated tar exposure and age. Multiple logistic regression provided models that helped predict symptoms and lung function impairment in smokers and ex-smokers on the basis of estimated tar exposure and pack-years of smoking. (Auth. Abs. Mod.)

86–0781. Roth, J.; Maehrlein, W.; Kummer, G., et al. **Ergebnisse Einer Epidemiologischen Analyse zur Pathogenese der Chronisch Obstruktiven Bronchitis des Bergmannes. [Results of an Epidemiological Analysis Concerning the Pathogenesis of Chronic Obstructive Bronchitis in Miners.]** *Zeitschrift fur Erkrankungen der Atmungsorgane* 164(3):277-279, 1985, German.

An epidemiological evaluation of chronic obstructive bronchitis in 5,605 miners (M), 1,276 former miners (FM), and 3,898 persons who never worked in mines (NM) found that smoking was the major factor contributing to disease pathogenesis, although dust exposure was found to increase disease incidence. Incidence of chronic bronchitis among nonsmokers <29 years old and >50 years old, respectively, was 1.1 and 20.5 percent in NM, 1.6 and 9.6 percent in M, and 0 and 15.0 percent in FM compared with incidence rates for smokers of 2.4 and 28.2 percent in NM, 4.8 and 34.6 percent in M, and 3.3 and 31.5 percent in FM. Incidence of obstructive symptoms in nonsmokers for each age group was 4.6 and 10.3 percent in NM, 0 and 10.8 percent in M, and 0 and 12.5 percent in FM compared with incidence rates for smokers of 6.1 and 14.2 percent in NM, 10.3 and 16.4 percent in M, and 6.6 and 16.0 percent in FM.

86–0782. Samet, J.M. **Less Hazardous Cigarettes and Diseases of the Lung. (Letter).** *Chest* 88(6):802-803, December 1985.

Although cigarette manufacturers have made extensive changes over the last 30 years (e.g., introduction of filters, reduction in tar and nicotine yields), it is less clear that there has been a parallel decline in the inhaled dose of cigarette smoke. Compensatory smoking may increase the dose of smoke components inhaled above those predicted by machine yields of tar and nicotine. While experimental approaches can be used to evaluate newer cigarettes, only epidemiologic studies can determine actual effects on health. Epidemiologic studies may, in turn, become compromised by incorrect information from subjects concerning types and brands of cigarettes smoked and inaccurate estimation of inhaled dose of tar and other smoke components. Epidemiologic studies also describe results of previously used cigarettes, not those currently smoked. Failure of epidemiologic studies to convincingly establish that newer cigarettes are less hazardous has led to the conclusion that alterations in cigarettes will probably not reduce incidence of lung cancer. New data from a large prospective study (*Chest* 88(6):849-855, December 1985) of respiratory diseases illustrates the difficulties in obtaining a lifetime smoking history and converting the information into a measure of tar exposure. It is unlikely that any low-tar cigarette will reduce disease risks as much as smoking cessation. See also 86-0780.

86–0783. Schlenker, E.H.; Leonardson, G.R.; McClain, C., et al. **The Prevalence of Respiratory Symptoms Among Farmers and Ranchers in Southeastern South Dakota.** *South Dakota Journal of Medicine* 38(7):5-9, July 1985.

Respiratory symptoms were reported more often by smokers than by ex-smokers or nonsmokers in a survey of farm owners in South Dakota. To evaluate the effect of smoking, the 176 respondents were separated into three groups: current smokers (9 percent), ex-smokers (35 percent), and lifetime nonsmokers (56 percent). Symptoms not related to farming were acknowledged by 71 percent of smokers, 34 percent of ex-smokers, and 30 percent of nonsmokers. Symptomology related specifically to farming increased to 55 percent ($p<0.01$) in nonsmokers and 64 percent ($p<0.01$) in ex-smokers, but remained at 71 percent in smokers. When symptoms were evaluated individually, smokers reported more chronic cough, phlegm, cough and phlegm, and wheezing than nonsmokers and ex-smokers. Runny eyes, runny nose, and cough were generally reported in conjunction with crop production during summer and fall, while cough associated with animal raising was prevalent throughout the year. Hogs and feeder pigs were most responsible for animal-related symptoms, with no differences reported for confinement vs. nonconfinement workers. Standardized American Thoracic Society questionnaires were used for the survey. (Auth. Abs. Mod.)

86–0784. Selig, R.; Nestler, K. **Zur Epidemiologie der Chronischen Bronchitis Unter Arbeitsmedizinischem Aspekt. [Epidemiology of Chronic Bronchitis From the Viewpoint of Occupational Medicine.]** *Zeitschrift fur Erkrankungen der Atmungsorgane* 164(3):273-276, 1985, German.

The relationship between chronic bronchitis and smoking, occupational dust exposure, and age was examined in male workers. Overall rate of dust-attributable bronchitis was 7.5 percent (0.97 percent in men aged <25 years and 23.2 percent in men aged >65 years). Incidence of bronchitis was 9.64 percent in heavy smokers, 6.56 percent in light smokers and ex-smokers, and 6.03 percent in nonsmokers. Risk of bronchitis was examined in relation to age for smoking without dust exposure and for dust exposure without smoking. Analysis revealed a higher bronchitis rate for dust exposure than for smoking in men aged <45 years and a higher rate for smoking than for dust exposure in men aged ≥ 45 years. The relative risk of bronchitis was found to increase with duration of dust exposure, with a risk of 1.7 after 16 to 20 years of exposure and 2.0 after exposure for 21 years or more. Compared with nonsmokers, the relative risk of bronchitis was 1.3 in ex-smokers and light smokers and 1.9 in heavy smokers (comparable to 20 years of dust exposure).

86–0785. Sutinen, S.; Koistinen, J.; Paakko, P. **A Necropsy Study of Pi Phenotypes, Emphysema, and Smoking.** *Acta Pathologica, Microbiologica et Immunologica Scandinavica* 93(4, Section A):183-188, July 1985.

Pi phenotypes (determined post mortem by isoelectric focusing and immunofixation), emphysema (assessed from inflation fixed specimens), and smoking history were correlated in 186 hospital necropsies. Pi phenotype was determined in 98.4 percent of the specimens. Phenotype M occurred in 87.5 percent, MZ in 8.1 percent, MS in 2.1 percent, and FM in 0.5 percent. An expected association was found between smoking and emphysema but not between Pi phenotypes and emphysema. Thus, the PiMZ heterozygous state does not seem to predispose to structural emphysema. However, the small number of cases did not allow estimation of the risk of smoking in PiMZ heterozygous persons compared with those with the normal Pi phenotype. (Auth. Abs.)

86–0786. Townsend, M.C.; Enterline, P.E.; Sussman, N.B., et al. **Pulmonary Function in Relation to Total Dust Exposure at a Bauxite Refinery and Alumina-Based Chemical Products Plant.** *American Review of Respiratory Disease* 132(6):1174-1180, December 1985.

Lung function effects of chronic dust exposure were examined in 1,142 male employees (402 never smokers, 337 ex-smokers, and 403 current smokers) of a company involved in mining and refining bauxite and production of alumina chemicals. Deviations from predicted forced expiratory volume in 1 sec (FEV_1) and percentage of subjects with $FEV_1 < 80$ percent of predicted were higher in smokers than in nonsmokers for all exposure groups. Never smokers had a pattern of decreasing FEV_1 with increasing duration and cumulative total dust exposure. Among never smokers with cumulative total dust exposures of ≥ 100 mg/m^3/year and ≥ 20 years of exposure, a mean reduction from predicted FEV_1 of 0.29 to 0.39 L was observed, in addition to a threefold to fourfold excess of observed/expected numbers of subjects with <80 percent of predicted FEV_1. Results were observed relative to an external and an internal comparison group. Among ex-smokers, pulmonary function levels closely resembled those of never smokers. Quality of smoking data was such that the separate effects of smoking and dust exposure could not be considered. (Auth. Abs. Mod.)

86–0787. Vollmer, W.M.; Johnson, L.R.; Buist, A.S. **Relationship of Response to a Bronchodilator and Decline in Forced Expiratory Volume in One Second in Population Studies.** *American Review of Respiratory Disease* 132(6):1186-1193, December 1985.

Bronchial hyper-responsiveness appears to be associated with an accelerated decline of forced expiratory volume in 1 sec (FEV_1) in nonsmokers, ex-smokers, and smokers, an association that exists before clinical disease is manifest. Bronchial responsiveness (to inhaled isoproterenol) as a risk factor for chronic airflow limitation was measured in 795 persons drawn from two cohorts followed over a 9- to 11-year period. Matched analysis compared 44 responsive cohort subjects with 132 nonresponsive controls. In both cohorts, level of response to isoproterenol was associated with rate of decline of FEV_1 only among responsive subjects. Responsive subjects tended to have smoked more heavily and for longer periods of time than the nonresponsive controls, but none of the differences were statistically significant. Results of matched analysis confirmed that the rate of decline of FEV_1 among responsive subjects was significantly greater than that observed in matched controls. Differences were present among smokers and nonsmokers and among subjects with and without doctor-diagnosed chronic bronchitis and asthma. (Auth. Abs. Mod.)

86–0788. Yasuoka, S.; Nakayama, T.; Kawano, T., et al. **Comparison of Cell Profiles of Bronchial and Bronchoalveolar Lavage Fluids Between Normal Subjects and Patients With Idiopathic Pulmonary Fibrosis.** *Tohoku Journal of Experimental Medicine* 146(1):33-45, May 1985.

Cell profiles of bronchial and bronchoalveolar lavage fluids (BLF and BALF) from patients with idiopathic pulmonary fibrosis (IPF, 13 smokers and 9 nonsmokers) were compared with those from normal volunteers (NV, 25 smokers and 26 nonsmokers) and age-matched controls (lung disease patients (CP), 25 smokers and 15 nonsmokers). The percentage of saline recovered was significantly lower in smokers in the CP and IPF groups. Total cell counts in BALF were higher in smokers than in nonsmokers in the CP and NV groups. However, in IPF nonsmokers, total cell count was about double that of CP controls. In BALF from controls (NV and CP), alveolar macrophages were predominant; neutrophils and eosinophils represented <1.0 percent of the total. BLF contained more neutrophils and epithelial cells than BALF in both control groups. Neutrophils represented 12 percent of inflammatory cells in BLF from NV subjects and 42 percent in CP controls. IPF patients had higher proportions of neutrophils and eosinophils in BALF than CP controls, but relative concentrations in BLF were comparable in the two groups. In the CP and NV groups, smokers had higher proportions of alveolar macrophages than nonsmokers. In IPF patients, the percentage of alveolar macrophages was lower in smokers than in nonsmokers. Results show that neutrophils are present in bronchi of healthy subjects, and that the higher levels of alveolar neutrophils are partly due to derangement of the alveolar structure.

See also, **86–0719**

CARDIOVASCULAR DISEASES

86–0789. Agner, E. **Some Cardiovascular Risk Markers Are Also Important in Old Age.** *Acta Medica Scandinavica* (Supplement 696):1-50, November 1984.

Prevalence and incidence of cardiovascular disease (CVD) was studied over a 10-year period in 230 men (76 percent smokers) and 210 women (39 percent smokers) 70 years old in 1967. The Glostrup study was designed to describe the prevalence of defined CVD manifestations at age 80 and their incidence over the 10-year period and to define CVD risk factors at age 70. Data showed that even at age 70, smoking is an important factor in excess mortality during the next decade. Among smokers, 32 percent of men and 20 percent of women inhaled, and 14 percent of men and 3 percent of women were heavy smokers (≥15 g tobacco/day plus inhalation). At age 70, median duration of smoking was 55 years for men and 38 years for women. In the following decade, excess total mortality was observed in 80-year-old male cigarette, cheroot, and heavy smokers. In women smokers, excess mortality was associated with inhalation. Mean life expectancy after age 70 for heavy smokers was 65 months for men and 84 months for women, 95 and 107 months for nonsmokers, and 93 and 106 months, respectively, for the rest. Neither heavy smoking, cigarette smoking, cheroot smoking, nor inhalation at age 70 was associated with excess cardiovascular disease (CVD) mortality or CVD events in the eighth decade; however, in both sexes heavy smoking was associated with excess mortality from malignant neoplasms and nonmalignant pulmonary diseases. In the population reexamined at age 80 years, presence of CVD was not associated with smoking habits at age 70. Data on other risk factors are provided. The decreasing importance with age of cholesterol as a risk factor is noted, while the significance of high triglyceride values in men as a CVD risk predictor had not previously been reported in old age. Body mass index was not related to total mortality or to CVD mortality or CVD events. In both men and women, high systolic blood pressure was related to excess CVD mortality. Decreased glucose tolerance and presence of CVD at age 70 were also associated with excess CVD mortality and with excess CVD events in the following decade.

86–0790. Balleisen, L.; Bailey, J.; Epping, P.-H., et al. **Epidemiological Study on Factor VII, Factor VIII and Fibrinogen in an Industrial Population: I. Baseline Data on the Relation to Age, Gender, Body-Weight, Smoking, Alcohol, Pill-Using, and Menopause.** *Thrombosis and Haemostasis* 54(2):475-479, August 1985.

Plasma fibrinogen levels were positively and significantly correlated with cigarette smoking in both men and women in the Munster Arteriosclerosis Study (MAS), which is collecting epidemiological data on clinical and laboratory variables for improving individual prediction of arteriosclerotic vessel disease. The consistent observation of higher fibrinogen levels in heavy smokers independent of age suggests two possible chains of pathogenetic events: (1) smoking to endothelial damage to activated coagulation to increased production and release of clotting factors; or (2) smoking to increase of clotting factors to tendency to thrombosis to mural microthrombi on an otherwise damaged endothelium. Nonsmokers and former smokers did not differ in coagulation factors. Data on the 2,880 men (34.3 percent smokers) and 1,306 women (34.6 percent smokers) provided baseline measurements of fibrinogen, factor VIIc, and factor VIIIc, and relationship to age, gender, body weight, smoking, alcohol, pill-using, and menopause. No correlation was found for alcohol consumption. Factor VIIIc and factor VIIc levels were significantly higher after onset of menopause and factor VIIc and fibrinogen levels were higher in women using the pill. (Auth. Abs. Mod.)

86–0791. Chaithiraphan, S.; Sahasakul, Y.; Charoenchob, N. **Acute Myocardial Infarction in the Young.** *Journal of the Medical Association of Thailand* 68(4):190-197, April 1985.

Cigarette smoking was the most prevalent risk factor for myocardial infarction (MI) in a retrospective study of 20 patients (>40 years of age) with transmural MI. Data showed that nine patients (45 percent) smoked <10 cigarettes/day), four patients had hypertension, and three were alcohol abusers. Hyperlipidemia, diabetes mellitus, positive family history, and stress were each identified in two patients. The youngest patient was 22 years of age and all but two patients were males. The majority (80 percent) had obstructive diseases of varying severity. Among patients under 30 years of age, half had normal coronary arteries. Prevalence of smoking did not appear to differ significantly from that observed in a group of 323 older patients with MI (42 percent smokers). Furthermore, although smoking is associated with premature arteriosclerosis, no evidence of arteriosclerotic obstruction was observed in three patients, all of whom were heavy smokers. A direct role of smoking in acute MI is suggested.

86–0792. Cosgrove, D.M.; Loop, F.D.; Lytle, B.W., et al. **Determinants of 10-Year Survival After Primary Myocardial Revascularization.** *Annals of Surgery* 202(4):480-490, October 1985.

Smoking ranked fourth among risk factors determining 10-year survival after primary myocardial revascularization in 8,000 patients (3,696 smokers) analyzed between 1971 to 1978. Other factors were advancing age ($p<0.0001$), impaired left ventricular function ($p<0.0001$), and no mammary artery graft ($p<0.0001$). Smoking as a risk factor ($p<0.0001$) was followed by abnormal EKG ($p<0.0001$), three vessel or left main vessel disease ($p<0.0001$), left ventricular end diastolic pressure >24 ($p<0.0002$), hypertension ($p<0.0003$), 1971 to 1974 surgical era ($p<0.007$), cholesterol >300 ($p<0.01$), incomplete revascularization ($p<0.01$), and two vessel disease (<0.02). Five-year survival for smokers was 92.3 percent compared with 94.1 for nonsmokers; 10-year survival for smokers was 77.6 percent compared with 81.0 for nonsmokers. (Auth. Abs. Mod.)

86–0793. Criqui, M.H.; Cowan, L.D.; Heiss, G., et al. **Frequency and Clustering of Nonlipid Coronary Risk Factors in Dyslipoproteinemia. The Lipid Research Clinics Program Prevalence Study.** *Circulation Supplement* 73(1, Part 2):I-40—I-50, January 1986.

In an evaluation of nonlipid coronary heart disease risk factors, smoking tended to be more common in persons with high-risk phenotypes and less common among those with low-risk phenotypes. Smoking a pack of cigarettes/day was independently associated with a consistent and striking lower level of high density lipoprotein (HDL) cholesterol and higher levels of low density lipoprotein (LDL) cholesterol, very low density lipoprotein cholesterol, and triglyceride. The frequency and clustering of five nonlipid risk factors (smoking, obesity, hypertension, sedentary lifestyle, and alcohol consumption) were evaluated in a defined population of 4,349 men and 3,398 women, divided into nine categorical lipoprotein phenotypes (normal, types I or V, IIA, IIB, III, IV, hypoHDL, hypoLDL, and hyperHDL). Analysis indicated that nonlipid coronary risk factors tend to be more frequent and thus cluster in individuals with "high risk" phenotypes and to occur less frequently in persons with "low risk" phenotypes. Identification of a high-risk phenotype suggests the presence of nonlipid risk factors, and the clinician should be alert to this possibility. Multivariable analysis of the independent associations of each of the risk factors with the lipid and lipoprotein components that define the phenotypes suggested that several behavioral risk factors may directly affect lipid and lipoprotein levels, raising the possibility that certain intervention strategies (weight loss, smoking cessation, and regular exercise) may favorably influence dyslipoproteinemia. (Auth. Abs. Mod.)

86–0794. Daly, L.E.; Graham, I.M.; Hickey, N., et al. **Does Stopping Smoking Delay Onset of Angina After Infarction?** *British Medical Journal* 291(6500):935-937, October 5, 1985.

The short- and long-term effects of smoking cessation on development of angina after myocardial infarction (MI) in survivors of an acute coronary attack were examined in 408 men (<60 years of age) who survived a first attack of unstable angina or MI by at least 28 days and were cigarette smokers at the time of the attack. Of the 384 men who were still alive at 1-year followup, 241 had stopped smoking. Prevalence of angina was 19.5 percent among ex-smokers compared with 32.2 percent among continuing smokers ($p<0.01$). However, 6 years later (7 years from first MI) prevalence was the same in both groups. It is concluded that onset of angina after MI can be delayed by cessation of smoking but that this effect is not maintained over the long term.

86–0795. Fenton, R.A.; Dobson, J.G., Jr. **Nicotine Increases Heart Adenosine Release, Oxygen Consumption, and Contractility.** *American Journal of Physiology* 249(3, Part 2):H463-H469, September 1985.

Continuous infusion of nicotine into the perfusing physiological saline (PS) elicited a propranolol (10^{-6} mol) sensitive transient elevation of developed left ventricular pressure (LVP) and maximum rates of left ventricular pressure development and relaxation ($\pm dP/dt_{max}$) within 20 seconds, which subsequently declined to maintained elevated plateau levels by 1 minute. The continuous infusions of nicotine to achieve PS concentrations of 0.0005, 0.0001, or 0.00005 mol, respectively, resulted in significant increases in the mean plateau levels of LVP (33.4, 10.1, or 6.3 percent), $+dP/dt_{max}$ (26.3, 10.8, or 6.9 percent) and $-dP/dt_{max}$ (35.0, 11.9, or 9.0 percent) at 1 minute. The inclusion of propranolol (10^{-6} mol) with or without atropine (10^{-6} mol) did not alter the maintained plateau responses to nicotine. During the plateau phase of the contractile response, oxygen consumption was significantly elevated by 36, 19, or 11 percent and mean levels for adenosine in the coronary effluent rose by 261, 76, or 74 percent in response to 0.0005, 0.0001, or 0.00005 mol nicotine, respectively. Nicotine did not influence (^{14}C) adenosine uptake. Results suggest that nicotine is capable of (1) augmenting cardiac contractility and oxygen consumption independent of β-adrenergic or muscarinic influence; and (2) elevating the appearance of adenosine in the coronary circulation presumably by enhancing myocardial production of the nucleoside. (Auth. Abs.)

86–0796. Fried, L.P.; Moore, R.D.; Pearson, T.A. **Long-Term Effects of Cigarette Smoking and Moderate Alcohol Consumption on Coronary Artery Diameter. Mechanisms of Coronary Artery Disease Independent of Atherosclerosis or Thrombosis?** *American Journal of Medicine* 80(1):37-44, January 1986.

Epidemiologic studies have shown that cigarette smoking (increased risk) and moderate alcohol consumption (decreased risk) have opposite effects in coronary artery disease. To investigate whether they act via the common mechanism of affecting the coronary diameter, 31 white men with arteriographically normal coronary arteries were evaluated. Histories of cigarette smoking (never smoker, ex-smoker, or current smoker) and alcohol consumption (nonuser, low user, or moderate user with an average of one drink/day) were analyzed for an association with coronary diameters. Nonsmokers had larger left main and left anterior descending diameters than either ex-smokers or current smokers ($p=0.0001$ and 0.004). Moderate alcohol users had larger left main and left anterior descending diameters than nondrinkers ($p=0.009$ and 0.01). Neither association was removed after adjustment for the other risk factor. Data suggest that smoking and moderate alcohol use have significant, independent, and opposite effects on long-term coronary diameter and may be important mechanisms for altering the risk of coronary artery disease. (Auth. Abs. Mod.)

86–0797. Friedlander, Y.; Kark, J.D.; Kaufmann, N.A., et al. **Coronary Heart Disease Risk Factors Among Religious Groupings in a Jewish Population Sample in Jerusalem.** *American Journal of Clinical Nutrition* 42(3):511-521, September 1985.

Smoking was more prevalent among secular residents than among the orthodox Jewish population in an investigation of the relationship of degree of religiosity and risk of coronary heart disease. Secular persons smoked more cigarettes/day than orthodox smokers (mean difference, 3.6 and 6.8 cigarettes for men and women, respectively). The number of secular women who smoked was more than double that among orthodox women (41 percent vs. 16 percent). Plasma levels of cholesterol, triglycerides, and low density lipoprotein cholesterol were also higher in secular Jews than in orthodox Jews. No differences in blood pressure and in high density lipoprotein cholesterol were observed. The secular group consumed more total fat, more saturated fatty acids, and less carbohydrates than the more religious group. Differences in nutrient intake reflected differences in food selection, notably consumption of dairy products. Findings of parallel differences in plasma lipids and in dietary intake are consistent with differing incidence of myocardial infarction in the religious groups of the Israeli population. Religiosity was classified according to self-ranking of perceived degree of religiosity (ultraorthodox, orthodox, traditional, or secular). (Auth. Abs. Mod.)

86–0798. Gordon, R.F. **Cardiovascular Effects of Tobacco Abuse.** *Delaware Medical Journal* 57(7):435-438, July 1985.

Cessation of smoking may be the most important single means of intervention currently available to use in the management of patients with established coronary heart disease. Excess risk of mortality declines within 1 to 5 years after stopping smoking, and 50 percent of the decrease in coronary heart disease mortality in the United States can be attributed to smoking cessation. Smoking constitutes about 20 percent of the overall risk of coronary heart disease in people under the age of 65. Smoking-related cardiovascular disease is estimated to account for more deaths than any other smoking-related disease. The risk of death from coronary disease is 70 percent higher in smokers than in nonsmokers and 200 percent higher in heavy smokers (>2 packs/day). The risk of sudden death is two to four times greater for smokers than for nonsmokers. By quitting smoking, the risk of dying from heart disease begins to recede almost immediately, and eventually becomes no greater than that experienced by someone who has never smoked at all. Therefore, even the elderly should be encouraged to quit smoking.

86–0799. Green, K.G. **Does Stopping Smoking Delay Onset of Angina After Infarction? (Letter).** *British Medical Journal* 291(6504):1281, November 2, 1985.

Previous research suggesting delayed onset of angina pectoris in ex-smokers after myocardial infarction (MI) (*British Medical Journal* 291(6500):935-937, October 5, 1985) is not supported by data from the practolol multicenter trial that followed up several times the number of patients. Separating patients into groups containing those with severe symptoms of angina and those with mild symptoms reveals very little difference in prevalence between smokers and nonsmokers. In the placebo group, 24.4 percent smokers and 21.3 percent ex-smokers suffered symptoms of severe angina at 6 months post-MI compared with 23.3 and 24.0 percent, respectively, in the practolol-treated group. Symptoms would be expected to be more severe in continuing smokers because of increases in blood pressure and heart rate that occur when smoking a cigarette; however, these last only a few minutes. It is suggested that smokers with angina tend to avoid exercise. See also 86-0794.

86–0800. Gritsiuk, A.I. **Vyrazhennost" Trombofilii i Tolerantnost" k Fizicheskoi Nagruzke u Bol"nyh Stenocardiei s Razlichnymi Factorami Riska Ishemicheskoi Bolezni Serdtsa. [Degree of Thrombophilia and Tolerance to Physical Load in Patients With Stenocardia Showing Different Risk Factors of Ischemic Heart Disease.]** *Vrachebnoe Delo* 5:56-60, May 1985, Russian.

The effects of smoking, obesity, hypercholesterolemia, diabetes mellitus, and sex (alone and in combination) on development of ischemic heart disease were investigated in patients with stenocardia (angina pectoris). Patients who smoked at least 15 cigarettes/day for a minimum of 15 years had a thrombophilia index of 129 percent compared with 128 percent for nonsmoking patients and 100 percent for normal controls.

Smokers experienced a decrease in physical load tolerance of 12.5 percent compared with a 13.9 percent tolerance decrease in nonsmokers. In men over 45 years of age, a combination of smoking and obesity, smoking and hypercholesterolemia, or all three factors together resulted in a thrombophilia index of between 135 and 140 percent. Their physical load tolerance was decreased by 39.7 ± 6.3 percent, 26 percent beyond that observed in controls. Patients with the greatest tendency toward thrombophilia or coronary insufficiency were those with advanced hypertension or diabetes mellitus, especially when occurring in association with obesity in women and obesity, hypercholesterolemia, and smoking in men.

86-0801. Gupta, S.P.; Siwach, S.B.; Manmohan, et al. **Comparative Study of Cigarette and Bidi Smoking on Left Ventricular Performance as Determined by Systolic Time Intervals.** *Journal of Association of Physicians of India* 33(7):449-452, July 1985.

Bidi and cigarette smoking effects on left ventricular (LV) performance determined by serial recording of systolic time intervals (STI) indicated an LV dysfunction after smoking that was diametrically opposite in coronary heart disease (CHD) patients compared with healthy subjects, reflecting an abnormal response of the ischemic myocardium to catecholamines. In normal individuals, prolongation in left ventricular ejection time (LVET(I)) and shortening of the pre-ejection period (PEP(I)) and PEP/LVET ratio occurred, whereas CHD patients experienced a lengthening of PEP(I) and PEP/LVET ratio and shortening of LVET(I). Effects also persisted longer in CHD patients than in normal subjects. Alterations in various STI parameters were quantitatively higher in cigarette smokers than in bidi smokers, and effects were more sustained in CHD patients. Although bidi tobacco has a higher nicotine content (4.40 percent) than cigarette tobacco (2.67 percent), less is released in bidi smoking. It is suggested that the derangement in STI parameters indicative of depressed LV performance was of longer duration in CHD patients because of compromised cardiac function even after good clinical recovery. (Auth. Abs. Mod.)

86-0802. Hallstrom, A.P.; Cobb, L.A.; Ray, R. **Smoking as a Risk Factor for Recurrence of Sudden Cardiac Arrest.** *New England Journal of Medicine* 314(5):271-275, January 1986.

Lifetable analyses showed that smokers who quit after surviving out-of-hospital cardiac arrest had lower incidence of recurrent arrest than patients who continued to smoke (19 vs. 27 percent at 3 years, $p=0.038$). The 310 coronary heart disease patients (219 who continued to smoke and 91 who quit) were stratified into groups that smoked <10 cigarettes/day, 10 to 20 cigarettes/day, and >20 cigarettes/day, and further subdivided according to mortality risk, based on recognized criteria. The expected first-year rate of recurrent arrest ranged from 2 to 40 percent. During followup (average 47.5 months), 104 of the 138 deaths that occurred were among continuing smokers; 85 (67 among continuing smokers) resulted from recurrent cardiac arrest. Thus, 30.6 percent of continuing smokers and 19.8 percent of ex-smokers had a recurrent cardiac arrest, whereas 16.8 percent and 17.6 percent, respectively, died of other causes. Continued smoking may have led to acceleration of an ongoing atherosclerotic process, but differences in early survival suggest that smoking may also act in the short term to enhance vulnerability to cardiac arrest. (Auth. Abs. Mod.)

86-0803. Hopkins, P.; Williams, R.R.; Hunt, S.C. **Coronary Heart Disease and Smoking. (Letter).** *Western Journal of Medicine* 143(5):682, November 1985.

Elevated serum cholesterol levels did not explain all the excess risk for coronary heart disease (CHD) associated with smoking among families prone to develop CHD as reported earlier (*Western Journal of Medicine* 141(2):196-202, August 1984), and in-depth examination of several families revealed other mechanisms at work. In one family, the five brothers and one sister all developed CHD disease before 60 years of age (four before age 42). Three had died of CHD, two as young as 38 years of age. Measurements were made of serum cholesterol, triglycerides, high density lipoproteins (HDL), apolipoprotein A_1, and apolipoprotein B in living coronary cases and in 73 other relatives. There was no consistent relationship between lipid levels and coronary disease occurrence in family members, but all affected persons smoked cigarettes. At least two other families, in which smoking as a solitary risk factor seemed to have played a dominant, causative role in the family's experience with early CHD, have been tentatively identified. Serum cholesterol levels in these families were in the permissive range, but were not greatly elevated (between 190 and 289 mg/dL). At least three other mechanisms for elevated CHD risk have been identified. Familial hypercholesterolemia and early onset of hypertension either alone or in conjunction with other risk factors seems to be the common denominator of CHD in some families. Also, two pedigrees with low HDL-cholesterol levels (26 mg/dL or less), segregated as a dominant gene phenotype, have been characterized. See also 85-0143, 86-0811.

86-0804. Jonason, T.; Ringqvist, I. **Factors of Prognostic Importance for Subsequent Rest Pain in Patients With Intermittent Claudication.** *Acta Medica Scandinavica* 218(1):27-33, 1985.

Smoking and arterial stenoses in the leg were found to be significantly correlated with increased risk of developing rest pain during a 6-year study of 224 nondiabetic patients with intermittent claudication. At initial examination, 167 were smokers; 21 stopped smoking within 2.3 ± 1.5 years. The proportion of patients without rest pain after 6 years was 92 percent of nonsmokers and ex-smokers who stopped within 1 year after initial examination, 79 percent of smokers and ex-smokers who stopped after more than 1 year, 86 percent of patients with single stenosis, and 70 percent of those with multiple stenoses. The difference between smokers and nonsmokers was significant ($p<0.03$) after adjustment for differences in presence of multiple stenoses. Results emphasize the importance of not smoking for patients with intermittent claudication. The increased risk of rest pain associated with the presence of multiple arterial stenoses in the leg should be considered when making decisions concerning vascular surgery. (Auth. Abs. Mod.)

86–0805. Kikumura, T. **Nokosai Hatsusho to Sonokiken Insi ni Kansuru Rinshoekigakuteki Kenkyu. Kuyama-cho Niokeru Nijunenkan no Tsuisekichosa Ketsu-ka, Oyobi Framingham Study Tono Kigaku Kento. [Risk Factors for Cerebral Infarction. A Prospective Clinico-Epidemiological Study in Hisayama Town, Japan, and a Comparison With the Survey Findings From Framingham, Massachusetts, U.S.A.]** *Fukuoka Acta Medica* 76(7):343-364, July 1985, Japanese.

Advancing age, hypertension, ECG abnormality, and impaired glucose tolerance were major risk factors of cerebral infarction (CI), contrary to serum total cholesterol, obesity, and cigarette smoking found in the Framingham long-term investigation of Caucasian residents. The Hisayama study followed 1,621 residents (707 men and 914 women aged 40 years and over) from 1961 to 1981. Presence of hypertension at initial examination agreed in number with the Framingham study, but hypercholesterolemia, obesity, and cigarette smoking were found less frequently. During 20-year followup, 263 subjects experienced first evidence of cerebrovascular disease. Of these, 188 (71.5 percent) were diagnosed as CI, the most common type of stroke. Incidence rate was 5.6/1,000/year for men and 2.9 for women, which is 2.7 times higher in men and 1.5 times higher in women than in the Framingham study. Risk increased with advancing age and hypertension, except in the eighth decade of life when CI incidence was found in normotensives. ECG abnormality was a significant risk factor for CI, other than age and blood pressure. Relative risk was 3.6 times higher in men, and 2.2 times in women. CI occurred more frequently in persons with high voltage R wave on ECG and with impaired glucose tolerance. Age and mean blood pressure were significant risk factors for both sexes, and abnormality of ECG was an important factor for men. (Auth. Abs. Mod.)

86–0806. Lepantalo, M.; Aromaa, A.; Klaukka, T. **Does β-Blockade Provoke Intermittent Claudication?** *Acta Medica Scandinavica* 218(1):35-39, 1985.

Comparison of current and previous use of β-blocking drugs in 55 case—control pairs revealed no association between intermittent claudication and β-blockade. However, smoking (an established risk factor for intermittent claudication) was a strong risk factor ($p<0.001$, RR 23.0). Cases were hospital patients with verified intermittent claudication; controls were from a nationwide health survey. The pool of potential cases and controls consisted of persons who had been treated with antihypertensive drugs, but did not have coronary heart disease. Controls and cases were matched for age, sex, place of residence, and time of examination. (Auth. Abs. Mod.)

86–0807. Lindholm, L.; Lithman, T. **Utility of a Population-Based Case—Control Study Model With a Limited Number of Patients in Estimating Risks of Hypertension.** *Acta Medica Scandinavica* 217(4):403-409, 1985.

Smoking and hypertension were independent risk indicators of myocardial infarction (MI) in men in an assessment of population-based case—control studies in a primary care district. Results for the limited number of patients were valid and in accord with those of more extensive and prospective studies. All new cases of MI (91 men and 20 women) and stroke (51 men and 20 women) in people born between 1912 and 1931 and diagnosed between 1973 and 1982 among the inhabitants of the Dalby primary care district in Sweden were identified and information on smoking habits and hypertension was collected. The relative odds of MI were estimated at 3.3 (range 1.7 to 6.2) in male smokers, 5.3 (range 1.4 to 20.5) in hypertensive male smokers, and 2.4 (range 1.1 to 5.1) in nonhypertensive male smokers. The estimated population-attributable risk of hypertension with respect to MI was 30 percent in all men and increased to 37 percent in smokers. Risk estimates for stroke in men and myocardial infarction or stroke in women were not calculated separately for smokers and nonsmokers.

86–0808. Lowe, G.D.O.; Robertson, J.; Dunn, F.G., et al. **Haematocrit in Patients Attending a Hypertension Clinic.** *Scottish Medical Journal* 30:168-172, July 1985.

Cigarette smokers had higher hematocrit than nonsmokers, but no significant differences in mean hematocrit were found in cigar or pipe smokers and ex-smokers compared with nonsmokers at a Glasgow Blood Pressure Clinic. Based on recent interest in the relationship of hematocrit and blood viscosity to hypertension and vascular disease, a retrospective analysis of the relationship of hematocrit to blood pressure, vascular complications, and other variables was conducted in 2,381 patients. Cigarette smoking was strongly correlated with increased hematocrit and increasing blood viscosity. Positive correlations were also found in both sexes between hematocrit and serum alanine aminotransferase (possibly the result of mutual correlation with alcohol) and between hematocrit and overweight (Quetelet Index), but not obesity (Ponderal Index). Increased hematocrit was also associated with a history of angina, myocardial infarction, and intermittent claudication in females. No correlation was observed between hematocrit and history of stroke. (Auth. Abs. Mod.)

86–0809. Notkola, V.; Punsar, S.; Karvonen, M.J., et al. **Socio-Economic Conditions in Childhood and Mortality and Morbidity Caused by Coronary Heart Disease in Adulthood in Rural Finland.** *Social Science and Medicine* 21(5):517-523, 1985.

Data from the East—West Study in Finland were examined to determine (1) if there was a relationship between living conditions in childhood (i.e., parents' socioeconomic status) and coronary heart disease (CHD) morbidity and mortality in adulthood, and (2) whether any increased risk could be attributed to typical CHD risk factors such as smoking and serum cholesterol. The initial cohort of 823 men in East Finland and 888 men in West Finland was examined in 1959 and again in 1964, 1969, and 1974. Data indicate that the relative risk of coronary death, myocardial infarction, and ischemic heart disease is systematically increased for those born landless in East Finland. Further analysis indicates that in both East and West Finland, the proportion of smokers was highest among those who were born landless. In East Finland, the higher proportion of smokers among the landless (73.5 percent) and small farmers (69.2 percent) than among the medium and large farmers (68.4 percent) may partially explain the increased relative risk of CHD in these groups. Small body height also partially explained increased CHD risks among the landless in East Finland, but no significant effect of serum cholesterol was observed.

86-0810. Ohnaka, T.; Tochihara, Y.; Yamazaki, S., et al. **Relationship of Blood Pressure to Multiple Personal Characteristics of Workers in a Factory.** *Annals Physiological Anthropology* 3(4):297-302, October 1984.

Body mass index, alcohol consumption, age, physical exercise, cigarette smoking, and job stress were predictors of systolic blood pressure, while body mass index, age, alcohol consumption, physical exercise, and cigarette smoking were predictor variables for diastolic blood pressure in Japanese workers at a machine production company (970 office workers and 477 factory workers, aged 20 to 63 years). The 812 smokers were classified into (1) 107 smokers of from 1 to 10 cigarettes/day; (2) 395 smokers of from 11 to 20 cigarettes/day; (3) 229 smokers of from 21 to 30 cigarettes/day; and (4) 81 who smoked ≥31 cigarettes/day. Smoking was significantly associated with blood pressure readings, but the magnitude of the association was small and not related to number of cigarettes smoked/day. Normalized score for a smoker of 1 to 10 cigarettes/day, for example, was significantly lower than for nonsmokers (including ex-smokers). (Auth. Abs. Mod.)

86-0811. Perkins, K.A. **Coronary Heart Disease and Smoking. (Letter).** *Western Journal of Medicine* 143(5):681, November 1985.

A previous study that suggested a "possibly synergistic interaction of cigarette smoking and family history" of coronary heart disease (CHD) on CHD risk (*Western Journal of Medicine* 141(2):196-202, August 1984) is complicated by methodology. Lipid profiles were obtained in only 81 of 2,473 proband and control relatives, and hyperlipidemia in other relatives was assessed through relatives, a notoriously unreliable method for obtaining information. There is a substantial body of evidence suggesting that one synergistic interaction effect on CHD risk involves smoking and elevated lipids. Consequently, it would appear likely that the interaction effect of smoking and family history in this study could largely be accounted for by familial aggregation of lipid levels. Identification of a synergistic interaction between smoking and elevated lipids would imply that those at risk for the health effects of smoking and, therefore, more likely to benefit from cessation are those with elevated lipids, determined not only by hereditary factors but by environmental factors and not necessarily those with a family history of CHD (although these groups most likely overlap to a great degree). Advocating CHD prevention efforts for those not necessarily at risk while ignoring others who may be at substantial risk is unfortunate. See also 85-0143.

86-0812. Pomrehn, P.; Duncan, B.; Weissfeld, L., et al. **The Association of Dyslipoproteinemia With Symptoms and Signs of Peripheral Arterial Disease. The Lipid Research Clinics Program Prevalence Study.** *Circulation Supplement* 73(1, Part 2):I-100—I-107, January 1986.

Smoking was more common and regular exercise less frequent among persons experiencing leg pain in an investigation of intermittent claudication, leg pain during a graded exercise test (GXT), and resting systolic pressures in the upper and lower extremities, recorded as indicators of peripheral arterial disease. Systolic pressures of the upper and lower extremities were measured in a subsample of participants. Lipid levels of persons with and without claudication and with or without GXT-induced leg pain were compared, as were lipid levels between groups with high and low arm to ankle systolic blood pressure ratios. High density lipoprotein cholesterol levels were lower and mean triglyceride level was higher in men with claudication, and cigarette consumption was higher and regular exercise less frequent. Men with type IIb dyslipoproteinemia were more likely to report claudication. Men and women with type IIb and men with type IV dyslipoproteinemia were more likely to have leg pain during GXT. No association between lipid levels and low arm to ankle pressure ratios were found in the subgroup. Results provide additional evidence that lipoprotein abnormalities are associated with peripheral arterial disease, and suggest increased risk of peripheral arterial disease in smokers. (Auth. Abs. Mod.)

86-0813. Rosenberg, L.; Kaufman, D.W.; Helmrich, S.P., et al. **The Risk of Myocardial Infarction After Quitting Smoking in Men Under 55 Years of Age.** *New England Journal of Medicine* 313(24):1511-1514, December 12, 1985.

The risk of myocardial infarction (MI) in cigarette smokers decreased after cessation to a level similar to that in men who had never smoked. The effect of quitting cigarette smoking on incidence of nonfatal MI was assessed in a case—control study of 1,873 men with first episodes of MI and 2,775 controls. For current smokers (men who had smoked in the previous year), estimated relative risk of MI, adjusted for age, was 2.9 compared with risk in never smokers (95 percent confidence interval 2.4 to 3.4). Among ex-smokers (those who had last smoked at least 1 year previously), relative risk declined to a value close to unity for those who had abstained for at least 2 years. Estimated risk was 2.0 (1.1 to 3.8) for men who had abstained for 12 to 23 months. For men who had abstained for longer intervals the estimated risk was about 1.0. Results were unchanged by allowance for multiple potential confounding factors. A similar pattern was apparent among ex-smokers who had smoked heavily for many years; men predisposed to MI because of family history, hypertension, or other risk factors; and men with no apparent predisposition. (Auth. Abs. Mod.)

86–0814. Sato, I.; Tomita, M.; Ohe, T., et al. **Age-Related Changes of Clinical Features and Prevalences of Coronary Risk Factors in Japanese Patients With Vasospastic Angina.** *Chest* 89(1):12-19, January 1986.

Coronary risk factors were determined in 147 patients with vasospastic angina (VA) and 356 patients with classic angina (CA) divided into three age groups: ≤ 49 years, 50 to 59 years, and ≥ 60 years. Prevalence of diabetes, hypercholesterolemia, hypertension, and obesity was higher among CA patients than among patients with VA; however, prevalence of smoking was higher among VA patients (83 vs. 75 percent, respectively, $p<0.05$). The difference was most striking among patients in the older age group: 90 percent of VA and 66 percent of CA patients were smokers. Smoking prevalence tended to increase with age among VA patients and to decrease with age among CA patients (66 percent in the oldest age group compared with 82 percent in the youngest age group, $p<0.01$). Smoking prevalence in each age group of male VA patients was significantly higher than in the general male population ($p<0.01$ for each age group). Results indicate that there is some relationship between cigarette smoking and occurrence of coronary spasm.

86–0815. Wadsworth, M.E.J.; Cripps, H.A.; Midwinter, R.E., et al. **Blood Pressure in a National Birth Cohort at the Age of 36 Related to Social and Familial Factors, Smoking, and Body Mass.** *British Medical Journal* 291(6508):1534-1538, November 30, 1985.

Cigarette smoking was not strongly associated with high blood pressure in men and not at all in women, suggesting that women may have protective biological factors such as endogenous sex hormones. Examination of 5,362 subjects at age 36 showed that 34.1 percent of men and 33.5 percent of women were smokers, but more men than women smoked heavily (11.6 and 5.2 percent smoked >20 cigarettes/day, respectively) and fewer men than women had never smoked (18.7 and 28.6 percent, respectively). Among men, smokers had significantly higher mean systolic blood pressure than nonsmokers ($p<0.02$), but no difference in mean diastolic pressure. Among women, no significant differences in blood pressure were observed between current smokers and nonsmokers. Diastolic pressure rose significantly in men with increasing number of cigarettes smoked/day, but no such association was found in women. Men and women of manual social class who had jobs, however, had significantly higher daily doses of tar, carbon monoxide, and nicotine ($p<0.01$) (estimated in mg/day) primarily as a result of cigarette choice. Multiple regression analysis showed that estimated daily doses of tar and nicotine in men were each significantly and independently associated with systolic but not diastolic blood pressure. No significant associations of these components with systolic or diastolic pressure was found in women. Prevalence of hypertension in men was almost twice that in women, but women were more likely to be receiving treatment. The relatively modest association of smoking with systolic pressure was not entirely surprising, since this young cohort may have been less inclined to smoke heavily. Differences between the sexes may have been related to protective biological factors such as endogenous sex hormones in women, and also to differences in types of employment and body mass. (Auth. Abs. Mod.)

See also, **86–0868**

PREGNANCY AND INFANT HEALTH

86–0816. Asmussen, I. **The Risk of Smoking During Pregnancy. Chromatin Changes in Cells of Umbilical Arteries From Newborns Delivered by Mothers Smoking More Than 10 Cigarettes Per Day.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 103-105.

Smoking during pregnancy may carry long-term risks beyond low birth weight, according to studies of umbilical arteries of infants of smokers. Early arteriosclerotic changes, such as increased endothelial cell death with increased endothelial and smooth muscle cell turnover rates, have been observed in umbilical arteries. Formation of pseudoendothelium by media smooth muscle cells and increased amounts of fibrous tissue with intense smooth muscle cell proliferation similar to adult atherosclerotic lesions were found. Such vascular lesions (macro- and microangiopathy) were demonstrated at birth in offspring of women who smoked >10 cigarettes/day during pregnancy and also in heavy smokers who smoked during the first trimester of pregnancy and then quit, suggesting that the first trimester of pregnancy may be the period when most damage occurs to the unborn child. Chromatin changes, studied in 22 heavy smokers and 30 nonsmokers, appeared as fine granular spots within the cell nucleus of both endothelial and smooth muscle cells in smokers ($p < 0.005$). Previously, similar chromatin changes had been observed only in relation to tumors in man. Nuclear changes found in healthy newborns of smokers may indicate altered nuclear activity in smokers' tissue. An increased frequency of cancer has been reported in offspring of animals exposed to smoke. The chromatin changes in cord vessels and placentas from newborns suggests that followup studies are needed to clarify the long-term risks of smoking during pregnancy.

86-0817. Baird, D.D.; Wilcox, A.J. **Smoking, Sex, and Pregnancy. (Letter).** *Journal of the American Medical Association* 255(1):35, January 3, 1986.

Questions raised in response (*Journal of the American Medical Association* 255(1):35, January 3, 1986) to data that showed reduced fertility should be added to the list of reproductive hazards of cigarette smoking (*Journal of the American Medical Association* 255(1):35, January 3, 1986) are addressed. First, counting menstrual cycles with sporadic birth control when determining time to conception may result in overestimation and underestimation. After excluding all such cycles, substantially reduced fertility still remains in smokers. Second, inclusion of women who were recently pregnant or nursing (conditions that may contribute to delayed conception) was controlled for in analyses. Finally, the data collected do not support the hypothesis that the observed reduction in fertility attributed to smoking may be due to differential incidence of sexually transmitted disease and related infertility problems, which are more common among smokers. Only 30 women (4 percent) reported ever having had a pelvic infection; even fewer reported a history of sexually transmitted disease. It is considered possible that cigarette smoking adversely affects tubal transport through some direct physiological pathway, or might predispose a woman to pelvic infections. See also 85-1789, 86-0829.

86-0818. Barbieri, O.; Ognio, E.; Rossi, O., et al. **Embryotoxicity of Benzo(*a*)pyrene and Some of Its Synthetic Derivatives in Swiss Mice.** *Cancer Research* 46(1):94-98, January 1986.

The teratogenicity of benzo(*a*)pyrene (BaP), benzo(*a*)pyrene-4,5-oxide (BPO), a racemic mixture of 7β,8α-dihydroxy-9α,10α-epoxy-7,8,9,10-tetrahydrobenzo(*a*)pyrene (BPDE), and 6-methylbenzo(*a*)pyrene (BP6M) was studied after direct injection into embryos of Swiss mice. Compounds were dissolved in acetone and trioctanoin and injected at doses ranging from 0.4 to 16.0 nmol/embryo on days 10, 12, and 14 of development. Transplacental effects of BaP given at the same gestational days and at comparable dose levels were also evaluated. Based on gross external and internal malformations, BPDE appeared to be the most potent embryotoxic and teratogenic compound tested, causing 85 percent of embryolethality and 100 percent of malformed fetuses in the group treated on day 10 of gestation. There were 61 and 27 percent of malformed fetuses following BPDE treatment on days 12 and 14 of gestation, respectively. Administration of BaP and BPO caused no significant increase of malformed fetuses in any of the developmental stages considered. BP6M induced multiple malformations in 50, 46, and 31 percent of fetuses treated on days 10, 12, and 14, respectively. Results combined with previous data emphasize the requirement of a common metabolic derivative of BaP to induce both teratogenesis and carcinogenesis in mice. (Auth. Abs. Mod.)

86-0819. Bruinse, H.W.; Van den Berg, H.; Haspels, A.A. **Smoking and Its Effect on Maternal Plasma Volume During and After Normal Pregnancy.** *European Journal of Obstetrics, Gynecology and Reproductive Biology* 20(4):215-219, October 1985.

The growth-depressing effect of smoking during pregnancy does not appear to be mediated by an influence on plasma volume expansion. Plasma volume (positively related to birth weight) was studied in 70 healthy women: 37 nonsmokers (Group I); 15 smokers of <10 cigarettes/day (Group II); and 18 smokers of >10 cigarettes/day (Group III). Mean birth weight and birth weight centile were significantly lower in groups II and III compared with group I, although no difference was observed between groups II and III. Mean placental index in group III was significantly higher than in groups I and II. No differences in plasma volume were observed between nonsmokers and smokers during and after pregnancy. It is concluded that smoking has little or no influence on plasma volume expansion in healthy women with a normal pregnancy and producing an infant with a birth weight between the 10th and 90th centile. However, birth weight and birth weight centile for smokers was about 7 percent lower than for nonsmokers.

86-0820. Counsilman, J.J.; Mackay, E.V. **Cigarette Smoking by Pregnant Women With Particular Reference to Their Past and Subsequent Breast Feeding Behaviour.** *Australian and New Zealand Journal of Obstetrics and Gynaecology* 25(2):101-107, May 1985.

Smokers were less informed about breast feeding and more often favored bottle feeding than nonsmokers or ex-smokers, and had more often been bottle-fed and weaned earlier. Smoking habits and infant feeding practices and other attitudes and physical attributes were determined for 1,790 postpartum mothers (375 smokers, 438 ex-smokers, and 971 nonsmokers). Smokers tended to have more emotional problems, more reproductive failures, and more low-birth-weight infants. Other findings indicate that compared with nonsmokers, smokers tended to be (1) younger; (2) taller; (3) lighter in weight; (4) less likely to be married; (5) without jobs; (6) of low economic status; (7) less likely to attend antenatal classes; and (8) of Northern European origin. Smokers also had extremes in pregnancy length (either shorter or longer), poorer health, fewer children, and less support with care of children. Nonsmokers as a group were similar to breast feeders as a group, while smokers resembled bottle feeders as a group. It is suggested that use of tobacco and choice of bottle feeding are probably attributes of nervous, insecure mothers. Smokers who did breast feed weaned infants earlier, probably because chemicals in tobacco smoke inhibit milk production. (Auth. Abs. Mod.)

86–0821. Cresswell-Jones, V. **Pregnancy and Patterns of Tobacco Use: Shifts and Direction.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 117-120.

Data on tobacco use before, during, and after pregnancy showed that 80 percent of the women surveyed were aware of smoking's adverse effects. The survey of 132 pregnant women in Canada also found that being pregnant was an important deterrent to the use of all drugs, with the exception of antacids. The proportion of smokers declined from 49 percent before pregnancy to 35 percent during pregnancy. The major reasons cited for not smoking were less desire to smoke and concern for the infant. After pregnancy, however, smoking increased again to before pregnancy frequency. Drugs most frequently used during pregnancy were tobacco, alcohol, and caffeine. Respondents were also asked to report on use of analgesics, antacids, cannabis, tranquilizers, and sedatives. The group ranged in age from 18 to 35 years; 36 percent were aged 22 to 25 and 26 percent were aged 26 to 30. Nearly 75 percent of the women were primigravidas. It is suggested that pregnancy, especially the first, offers a potentially useful opportunity for drug prevention education.

86–0822. Dechene, J.-P. **Alfentanil as an Adjunct to Thiopentone and Nitrous Oxide in Short Surgical Procedures.** *Canadian Anaesthetists Society Journal* 32(4):346-350, July 1985.

Smokers were more likely than nonsmokers to recover from alfentanil (an analgesic for short surgical procedures) in 30 minutes or less. The narcotic was used as an adjunct to thiopentone and nitrous oxide anaesthesia in 109 patients undergoing dilatation and curettage (D and C) or therapeutic abortion (TA). Significantly more patients in the TA group were smokers ($p<0.01$) than in the D and C group. In the combined group, 78 percent of smokers and 59.3 percent of nonsmokers recovered in 30 minutes or less ($p=0.037$). In the TA group, 76.7 percent of smokers and 54.4 percent of nonsmokers recovered in 30 minutes or less ($p=0.041$). The trend was similar in the D and C group: 85.7 percent of smokers and 65.4 percent of nonsmokers recovered in 30 minutes or less. The lack of statistical significance for the D and C group was the result of the small numbers in each smoking category. (Auth. Abs. Mod.)

86–0823. Dumont, M.; Mazuez, M. **Etude des Facteurs Etiologiques de l'Hypotrophie Foetale. A Propos de 600 Observations. [The Etiological Factors of Fetal Growth Retardation: Study of 600 Cases.]** *Journal de Gynecologie Obstetrique et Biologie de la Reproduction* 14(4):439-448, 1985, French.

Heavy smoking was an important etiological factor in intrauterine growth retardation in 600 cases (out of 24,906 deliveries) over an 11-year period from 1970 to 1981. Of 1,498 infants born weighing <2,500 g, 600 were classed as intrauterine growth-retarded (40 percent) and 898 were premature with normal weight for gestational age. Of the 600 small-for-date infants, 227 were born before the 38th week of pregnancy (37.8 percent) and 158 of the mothers (26 percent) had toxemia of pregnancy. Histological abnormalities such as infarcts (47 cases) and ischemic necrosis (18 cases) were observed in 113 placentas (18.8 percent) and attributed to toxemia of pregnancy and/or heavy maternal smoking in 58 percent of the cases. Of mothers who smoked, 13.8 percent consumed >10 cigarettes/day and 5.5 percent consumed >20 cigarettes/day. Recurrent fetal growth retardation (excluding cases of toxemia), defined as three or more small-for-date infants born to the same mother without any particular etiological reason, was found in 22 out of 93 women having at least three children, or 23 percent of cases. It is suggested that a genetic factor may be involved. (Auth. Abs. Mod.)

86–0824. Jarnfelt-Samsioe, A.; Eriksson, B.; Waldenstrom, J., et al. **Some New Aspects on Emesis Gravidarum. Relations to Clinical Data, Serum Electrolytes, Total Protein and Creatinine.** *Gynecologic and Obstetric Investigation* 19(4):174-186, 1985.

No apparent relationship was found between emesis gravidarum (vomiting during pregnancy) and tobacco use in 102 healthy pregnant women in an investigation of nausea and vomiting in early pregnancy. Only 16 percent reported smoking tobacco (half of the women reported using tobacco in previous pregnancies), and about three-quarters of the women reported little or no alcohol use during pregnancy. Nausea and vomiting were evaluated in relation to clinical data, serum electrolytes, creatinine, total protein, and hemoglobin. More multigravidae suffered from emesis gravidarum than primigravidae; frequency was especially high in women with short intergestational intervals. Systolic blood pressure declined only in nonemetic women. Diastolic blood pressure in late pregnancy was significantly higher in emetic women than in nonemetic women. All laboratory values were within normal ranges. Major changes occurred in all pregnancies, but some alterations were noted only in emetic pregnancies. A different response to the hormonal situation is suggested as an explanation for dissimilarities between emetic and nonemetic pregnancies. (Auth. Abs. Mod.)

86–0825. Lichtensteiger, W.; Schlumpf, M. **Prenatal Nicotine Affects Fetal Testosterone and Sexual Dimorphism of Saccharin Preference.** *Pharmacology, Biochemistry and Behavior* 23(3):439-444, September 1985.

Prenatal exposure to nicotine was found to interfere with development of the male gonadal axis and with the organization of sexually dimorphic behavior in rats. Time-pregnant Sprague-Dawley rats were implanted on gestational day (GD) 12 with an osmotic minipump containing either nicotine tartrate, tartaric acid, or saline. Others were sham-operated on GD 12 or left untreated. Male fetuses of all control groups displayed the characteristic rise in plasma testosterone at GD 18, which was abolished by nicotine. Adult offspring of untreated or tartaric acid-treated dams exhibited a marked sexual dimorphism in their preference for saccharin-containing drinking water at 0.06-0.25 percent. No such sex difference was seen in offspring of nicotine-treated rats. In controls, the sexes differed with respect to the proportion of rats with high saccharin preference. In the group of males prenatally exposed to nicotine, the proportion of animals with high preference increased to the proportion found among females. (Auth. Abs. Mod.)

86-0826. Lumley, J.; Correy, J.F.; Newman, N.M., et al. **Cigarette Smoking, Alcohol Consumption and Fetal Outcome in Tasmania 1981-82.** *Australia and New Zealand Journal of Obstetrics and Gynaecology* 25(1):33-40, February 1985.

Smoking was associated with lower birth weight and poorer fetal outcome regardless of socioeconomic status, parity, maternal age, or alcohol consumption in a survey of Tasmanian women in 1981 and 1982. Almost 60 percent of women in households where the main income earner was unemployed were smokers, compared with 14 percent of women in households where the main income earner was a professional. Women in third or later pregnancies were more likely to smoke >20 cigarettes/day. Maternal age showed a strong association with smoking (most common in women under 25 years of age). Moderate and heavy smoking (>10 cigarettes/day) increased with alcohol consumption; 18.6 percent of those who drank two or more glasses of alcohol/day reported smoking >20 cigarettes/day. Prevalence of low birth weight infants (<2.5 kg) increased with smoking level (3.3 percent among nonsmokers, 5.7 percent among light smokers, 8.1 percent among moderate smokers, and 10.0 percent among heavy smokers).

86-0827. Oster, G.; Delea, T.E.; Colditz, G.A. **The Effects of Cigarette Smoking During Pregnancy on the Incidence of Low Birth Weight and the Costs of Neonatal Care.** Harvard University, John F. Kennedy School of Government, Institute for the Study of Smoking Behavior and Policy, Cambridge, Massachusetts, Discussion Paper Series S-86-01, January 1986, 13 pp.

Cigarette smoking during pregnancy is not only a significant threat to neonatal health but also a sizable economic burden to the medical care system. Maternal smoking during pregnancy was responsible for 35,816 (14.5 percent) low-weight births in the United States in 1983 and an estimated 14,978 (6.6 percent) of 228,297 admissions to neonatal intensive care units. Total intensive care costs amounted to 180 million dollars, or approximately 5.7 percent of total national expenditures on neonatal intensive care in 1983. Of this amount, 175 million dollars represent additional costs of care that would not have been incurred in absence of smoking during pregnancy. It is concluded that cost of neonatal care in the United States in 1983 was 189 dollars higher per infant born to women who smoked during pregnancy than for those born to women who did not smoke. (Auth. Abs. Mod.)

86-0828. Pulkkinen, P. **Smoking and Pregnancy: The Influence of Maternal and Gestational Factors on the Outcome of Pregnancy and the Newborn.** *Annales Chirurgiae et Gynaecologiae* 74(Supplement 197):55-59, 1985.

When maternal size, gestational age, and weight gain were standardized, smoking remained the only significant contributor to the differences in newborn characteristics observed between smokers and nonsmokers. The influence of maternal smoking and maternal and gestational factors on pregnancy outcome and neonatal characteristics was investigated in a multivariate case—control study of 576 pregnant women. At the first trimester visit to a pregnancy care unit, 162 were light smokers, 46 were moderate smokers, 80 were ex-smokers, and 288 were nonsmokers. The following statistically significant differences were found between study groups: (1) moderate smokers gained less weight ($p \leq 0.05$), (2) newborns of light and moderate smokers weighed less ($p \leq 0.01$ and $p \leq 0.001$, respectively) and were shorter ($p \leq 0.05$ for both groups) than newborns of nonsmokers, and (3) newborns of moderate smokers had smaller mean head circumference ($p \leq 0.05$) than infants in the other groups. The decrements in neonatal size observed resulted in a higher placental ratio among light and moderate smokers compared with ex- or nonsmokers ($p \leq 0.01$). No differences were observed between ex-smokers, women who stopped smoking during the first trimester, and nonsmoking controls. (Auth. Abs. Mod.)

86-0829. Rosenberg, M.J.; Spira, A.V. **Smoking, Sex, and Pregnancy. (Letter).** *Journal of the American Medical Association* 255(1):35, January 1986.

A previous report of reduced fecundity among women who smoke (*Journal of the American Medical Association* 253(20):2979-2983, May 24-31, 1985) may overestimate the magnitude of the effect for two reasons. First, the time to conceive may have been artifactually lengthened by consideration of sporadic use of contraceptives as half cycles with rounding down to the nearest full cycle. Since smokers used contraceptives sporadically 1.5 times as often as nonsmokers, this treatment would lengthen the interval to conception differentially for smokers. Second, only women seeking prenatal services were included. Thus, women with early spontaneous abortions (more common among smokers) were excluded. Since recent pregnancy or nursing was the variable most strongly associated with reduced fecundity, the effect would be to overestimate impairment of fecundity by smoking. Smoking effects on fecundity, if it does exist, is probably subtle. A further question is whether smoking exerts a direct effect on oogenesis, spermatogenesis, implantation, or early embryonic development (as suggested by numerous studies) or whether it reflects other risk-taking behaviors such as greater risk of sexually transmitted diseases and related infertility problems, which are common among smokers. See also 85-1789.

86–0830. Rubin, P.E.; Craig, G.F.; Gavin, K., et al. **Prospective Survey of Use of Therapeutic Drugs, Alcohol, and Cigarettes During Pregnancy.** *British Medical Journal* 292(6513):81-83, January 11, 1986.

Data on drug use during pregnancy, recorded prospectively in 2,765 women attending antenatal clinics, showed a nearly fivefold decrease in alcohol consumption but only a twofold decrease in smoking compared with a similar survey conducted 20 years earlier. In the 1982 to 1984 study, 2,588 (93.6 percent) avoided exposure to drugs during the first trimester, 1,802 (65.2 percent) took no drugs at any stage, 963 (34.8 percent) took a total of 154 different drugs from 35 groups of drugs, and 243 (8.8 percent) took a self-administered drug. In the 1963 to 1965 study, 195 out of 911 (21.4 percent, $p<0.001$) avoided drugs completely, 685 (75.2 percent, $p<0.001$) in the first trimester, and 586 (64.4 percent, $p<0.001$) self-administered drugs. More women abstained totally from alcohol: 1,786 (64.6 percent) versus 109 (12.0 percent) previously, $p<0.001$. While more women were nonsmokers in the more recent study (65.5 vs. 43 percent, $p<0.001$), the trend is less dramatic. Of 953 smokers, 429 smoked <11 cigarettes/day, 434 smoked between 11 and 20 cigarettes/day, and 90 smoked >19 cigarettes/day during pregnancy. The number of women who smoked was similar to that of young women who smoked in the west of Scotland. Reasons suggested are that the habit-forming nature of smoking makes it easier to stop drinking than to stop smoking and that the risks of fetal alcohol syndrome have been widely publicized.

86–0831. Shiono, P.H.; Klebanoff, M.A.; Rhoads, G.G. **Smoking and Drinking During Pregnancy. Their Effects on Preterm Birth.** *Journal of the American Medical Association* 255(1):82-84, January 1986.

A prospective study of 30,596 women in California found that preterm births (<37 weeks' gestation) were 20 percent more common in women who smoked at least one pack of cigarettes/day. The preterm birth effect was strongest before 33 weeks, with 60 percent excess that was not attributable to differences in maternal age, education, ethnicity, time prenatal care began, drinking during pregnancy, or eight other potentially confounding factors. The preterm birth rate among nonsmokers was 6.8 percent. Among women who smoked less than one pack/day and more than one pack/day, rates were 8.4 percent and 8.1 percent, respectively. Corresponding unadjusted odds ratios were 1.2 for light smokers ($p<0.001$) and 1.2 for heavy smokers ($p=0.003$). Overall, 14.6 percent smoked less than one pack/day and 13.3 percent smoked one pack/day or more. Smokers were further divided into blacks (38 percent), whites (30 percent), Hispanics (21 percent), and Asians (10 percent). Although blacks had the highest prevalence of smoking, whites were more likely to smoke heavily (17 vs. 10 percent). Smoking and drinking were highly correlated; 80 percent of nondrinkers were nonsmokers (40 percent of heavy drinkers did not smoke). (Auth. Abs. Mod.)

See also, **86–0836, 86–0892, 86–0917, 86–0919**

OTHER DISEASES AND CONDITIONS

86–0832. Agrawal, N.M.; Saffouri, B.; Kruss, D.M., et al. **Healing of Benign Gastric Ulcer. A Placebo-Controlled Comparison of Two Dosage Regimens of Misoprostol, A Synthetic Analog of Prostaglandin E_1.** *Digestive Diseases and Sciences* 30(11):164S-170S, November 1985.

Tobacco use had a deleterious effect on ulcer healing in 299 outpatients being treated with 25 or 100 µg misoprostol or placebo in a multicenter randomized double-blind parallel-group comparison. Misoprostol, a synthetic prostaglandin E_1 methyl ester analog with gastric antisecretory and cytoprotective properties, prevents development of acute experimental gastric and duodenal ulcers in various animal models. A statistically significant difference in gastric ulcer healing rate was seen at 8 weeks among the treatment groups: misoprostol 100 µg (62.0 percent), misoprostol 25 µg (50.5 percent), and placebo (44.7 percent). The proportion of patients who smoked was 64.9, 64.2, and 66.0 percent, respectively. The proportion of subjects healed in 8 weeks or less was highest in the misoprostol 100 µg group. It is concluded that misoprostol (100 µg four times/day for up to 8 weeks) is safe and effective for treatment of benign gastric ulcer. (Auth. Abs. Mod.)

86–0833. Brand, D.L.; Roufail, W.M.; Thomson, A.B.R., et al. **Misoprostol, A Synthetic PGE_1 Analog, in the Treatment of Duodenal Ulcers. A Multicenter Double-Blind Study.** *Digestive Diseases and Sciences* 30(11):147S-158S, November 1985.

Nonsmokers had a higher healing rate of benign gastric ulcer than smokers in a multicenter double-blind study of 308 patients randomized into three treatment groups: misoprostol

50 μg, misoprostol 200 μg, and placebo. The study compared the efficacy in ulcer healing and the safety of dosages. After 2 weeks of treatment, the three groups had similar percentages of patients with complete healing. However, after 4 weeks, 76.6 percent of patients taking misoprostol 200 μg four times/day had complete healing, compared with 42.6 percent of patients on misoprostol 50 μg four times/day and 51 percent of those on placebo ($p < 0.001$, 200 μg vs. placebo). A greater number of ulcers were healed in nonsmokers than in smokers at both 2 and 4 weeks. It is concluded that misoprostol 200 μg, when taken four times/day, is effective, safe, and well tolerated. (Auth. Abs. Mod.)

86-0834. Brandstaetter, G.; Kratochvil, P. **Comparison of Two Sucralfate Dosages (2 g Twice a Day Versus 1 g Four Times a Day) in Duodenal Ulcer Healing.** *American Journal of Medicine* 79(Supplement 2C):36-38, August 30, 1985.

The effects of two dosage regimens of sucralfate on ulcer healing in 74 patients (40 smokers) with endoscopically proved duodenal ulcer were compared. Dosage was either 2 g twice/day (1/2 hour before breakfast and at night) or 1 g four times/day (1/2 hour before meals and at night). Endoscopy was performed after 4 weeks, and if complete healing was not achieved, after an additional 4 weeks. Clinical assessment was carried out every 2 weeks. After 4 weeks, ulcers had healed in 28 of 36 patients (78 percent) who received sucralfate twice/day and in 28 of 38 patients (74 percent) who received sucralfate four times/day. Healing rates in the smokers and nonsmokers (78 and 74 percent, respectively, at 4 weeks and 83 and 85 percent, respectively, at 8 weeks) did not differ between dosage groups. The two dosage regimes appear to be equally effective, regardless of smoking habits. (Auth. Abs. Mod.)

86-0835. Brodzka, W.; Thornhill, H.L.; Howard, S. **Burns: Causes and Risk Factors.** *Archives of Physical Medicine and Rehabilitation* 66(11):746-752, November 1985.

In a retrospective study of burn injuries in 277 consecutive adult patients hospitalized over a 5-year period (1975-1979), the most common smoking-related scenario involved a person with a lighted cigarette falling asleep in bed. Patients' characteristics and prevalence of established predisposing factors were also examined. Of 37 cigarette smoking-related accidents (30 in homes and 4 in health care facilities), 3 resulted in death. All age groups were represented among the 22 men and 15 women, but most were young or middle-aged. In 27 cases, the smoker fell asleep with a lighted cigarette. In all instances, a dropped cigarette or match had ignited clothing (usually pajamas or a nightgown). Smoking while handling flammable liquids caused burns in three persons. Analysis of predisposing factors indicated that 76 percent of patients had one or more of the established risk factors, which included alcohol abuse, advanced age (>60 years), physical or mental illness, cerebrovascular disease, cardiovascular disease, drug abuse, and epilepsy. The four major agents identified as responsible for burn injuries were flames, scalding hot water, chemical substances, and hot surfaces.

86-0836. Cole, H. **Studying Reproductive Risks, Smoking.** *Journal of the American Medical Association* 255(1):22-23, January 3, 1986.

It is now widely recognized that cigarette smoking is hazardous to reproductive as well as cardiovascular and pulmonary health. Evidence is mounting that cigarette smoking, which can impair a woman's ability to conceive, jeopardize the health of the unborn child, and shorten reproductive life span, may also impair male fertility. Research has indicated that female smoking may contribute to (1) low birth weight infants and preterm delivery; (2) increased risk of infertility (women who smoke are 3.4 times more likely than nonsmokers to take longer than a year to conceive); (3) increased likelihood of experiencing early pregnancy loss and more likelihood that the abortuses will be chromasomally normal; and (4) decrease of between 1 and 2 years in reproductive lifespan (an irreversible effect of a dose-dependent decrease in oocyte number in the ovaries). Investigations of passive smoking effects suggest that women exposed to sidestream smoke during pregnancy are also at risk of delivering growth-retarded infants. The risk is approximately the same as that found for women who smoke. There is also evidence that smoking may have adverse effects on male fertility by impairing the number, motility, and shape of sperm.

86-0837. Cox, N.H.; Ray, S. **Palmoplantar Pustulosis and Smoking. (Letter).** *British Medical Journal* 291(6504):1278-1279, November 2, 1985.

A possible mechanism for the association between cigarette smoking and palmoplantar pustulosis confirmed in a previous report (*British Medical Journal* 291(6499):861-864, September 28, 1985) is explored. Since blood neutrophil count and stimulated neutrophil superoxide release are increased in smokers, it is suggested that altered neutrophil function may account for accumulation of neutrophil polymorphonuclear leukocytes in epidermal spongiform pustules, a characteristic feature of this disorder. Neutrophil morphology was assessed in freshly prepared blood smears from 16 patients with palmoplantar pustulosis (10 smokers, 4 ex-smokers), 32 with psoriasis (a disorder with similar histology), and 22 healthy controls. The mean proportion of neutrophils with polarized morphology or membrane ruffling was 24.4, 18.4, and 11.8 percent, respectively; however, no difference was observed between results for smokers and nonsmokers within the three groups. Although preliminary results suggest that peripheral blood neutrophil morphology is not altered by cigarette smoking, further studies of the relationship between psoriasis, palmoplantar pustulosis, smoking, chemoattractant production, and neutrophil function are recommended. See also 86-0538.

86–0838. Dammann, H.-G. **Rauchen und Ulkusheilung. [Smoking and Ulcer Healing.]** *Die Medizinische Welt* 36(21):18, May 24, 1985, German.

Incidence of gastrointestinal ulcers is higher, healing rate is slower, and relapse rate is higher among smokers than among nonsmokers regardless of treatment method. Among patients with ulcer perforation, 87 percent were smokers and 80 percent of patients undergoing ulcer surgery were smokers. Although consumption of <10 cigarettes/day did not influence incidence, cure, and relapse rates, ulcer incidence was significantly higher, cure rates were significantly lower, and relapse rates were almost 100 percent in patients who smoked ≥ 30 cigarettes/day. Since smoking counteracts inhibition of acid secretion by H_2-antagonists, patients should be encouraged not to smoke after taking medication. Successful ulcer treatment has been achieved in smokers with a single dose of 300 mg ranitidine at night for 4 weeks. A lower cure rate of 75 percent has been achieved in smokers receiving 150 mg ranitidine under similar conditions. However, smoking cessation should still be advised.

86–0839. Ghosh, S.K.; Parikh, J.R.; Gokani, V.N., et al. **Occupational Health Problems Among Tobacco Processing Workers: A Preliminary Study.** *Archives of Environmental Health* 40(6):318-321, November-December 1985.

Mild nicotine toxicity appeared to be the cause of vomiting, giddiness, headache, tiredness, loss of appetite, and other problems among 100 tobacco processing workers (74 women and 26 men) in two Indian factories. Health problems associated with handling dried non-Virginia tobacco leaves in bidi tobacco processing industries were investigated. Biochemical parameters were found to be within the normal range, electrocardiographic findings were nonspecific, and clinically there was no evidence of hypertension or ischemic heart disease. However, nicotine and cotinine excretion rates were increased in exposed workers. Dust and nicotine concentrations in air samples suggested that nicotine may have been inhaled by workers and possibly promoted through moisture of perspiration during summer months. Among exposed workers, 56 women and 10 men were nonsmokers; 18 women and 16 men (including smokers and chewers who used snuff instead of tooth powder to clean their teeth) were addicted to tobacco. (Auth. Abs. Mod.)

86–0840. Gutteridge, D.H. **Periodontal Diseases and Smoking. (Letter).** *Medical Journal of Australia* 143(6):241, September 1985.

An earlier report on periodontal diseases failed to emphasize the relationship with smoking. In one study, acute necrotizing ulcerative gingivitis was associated with smoking in 94 percent of patients (only 37 percent of a matched control group were smokers). The U.S. First National Health and Nutrition Examination Survey, reviewed in 1983 to investigate the association between periodontal disease and smoking, found that smokers have poorer oral hygiene than ex-smokers and nonsmokers. Smokers also have poorer periodontal health, a finding not entirely accounted for by comparative lack of oral hygiene. The association between poorer levels of periodontal health and smoking remained even after differences in age, sex, race, oral hygiene, socioeconomic status, and frequency of daily brushing of teeth were taken into account.

86–0841. Hauger-Klevene, J.H.; Balossi, E.C. **Smoking, Sex, and Pregnancy. (Letter).** *Journal of the American Medical Association* 255(1):35-36, January 3, 1986.

Recent data that showed reduced fertility should be added to the growing list of reproductive hazards of cigarette smoking (*Journal of the American Medical Association* 253(20):2959, May 24-31, 1985) are supported by data from a population study in Zarate, Argentina, that evaluated cardiovascular risk factors. Among 73 normotensive men aged 30 to 59 years, smoking significantly increased serum prolactin levels in a dose—response manner ($p<0.001$). The relationship between smoking and decreased conception may result from the effect of smoking on prolactin secretion, since hyperprolactinemic men have been reported to have smaller testes and prostate glands. Smoking may also affect female fertility through an effect on prolactin secretion; impaired release of luteinizing hormone in response to estrogen may cause annovulation in hyperprolactinemic women. Results imply a relationship between smoking and reproduction and indicate that smoking habits should be taken into consideration in both men and women presenting with reduced fertility. See also 85-1789.

86–0842. Hoeffner, U. **Ulkus: Versuchen Sie ein Rauchverbot! [Ulcer: Try Prohibition of Smoking!]** *Fortschritte der Medizin* 103(21):85, June 6, 1985, German.

Relapse rates among 370 duodenal ulcer patients were 34 percent for smokers and 18 percent for nonsmokers under treatment with H_2-antagonists and 72 and 21 percent, respectively, in patients receiving placebo. The question whether smoking itself or the smoker's personality is responsible for ulcer development is discussed. Possible mechanisms of ulcer development in smokers include increased biliary salt reflux and decreased bicarbonate secretion. Smoking also decreases the ability of H_2-antagonists (cimetidine and ranitidine) to inhibit acid secretion. As a result, cure rates appear to be higher when H_2-antagonists (e.g., ranitidine 300 mg) are given as a single daily dose at night following the last cigarette. It is suggested that knowledge of the personality characteristics of smokers may be useful in influencing them to quit. Smoking cessation is considered obligatory for successful ulcer treatment.

86–0843. Hofstetter, A.; Schutz, Y.; Jequier, E., et al. **Increased 24-Hour Energy Expenditure in Cigarette Smokers.** *New England Journal of Medicine* 314(2):79-82, January 1986.

Whole-body energy expenditure measured in eight healthy cigarette smokers over a 24-hour period indicated that smoking induced a 10 percent increase in expenditure in all subjects not only during the day when cigarettes were smoked, but also during the following night. Findings also indicate that energy expenditure can be expected to decrease with cessation of smoking, thereby favoring weight gain. Eight habitual smokers (22 to 29 years of age, 20 cigarettes/day) were studied for 24 hours in a respiration chamber on two separate occasions: (1) while 24 cigarettes were smoked at fixed intervals and (2) while refraining from smoking completely. Diet and physical exercise (30 minutes of treadmill walking) were standardized on both occasions. Physical activity in the chamber was measured by use of a radar system. Smoking caused an increase in total 24-hour energy expenditure (from a mean value ($\pm$SEM) of 2230 ± 115 to 2445 ± 120 kcal/24 hours; $p < 0.001$), although no changes were observed in physical activity or mean basal metabolic rate (1545 ± 80 vs. 1570 ± 70 kcal/24 hours). During smoking, mean diurnal urinary excretion of norepinephrine ($\pm$SEM) increased from 1.25 ± 0.14 to 1.82 ± 0.28 µg/hour ($p < 0.025$) and mean nocturnal excretion increased from 0.73 ± 0.07 to 0.91 ± 0.08 µg/hour ($p < 0.001$). (Auth. Abs. Mod.)

86–0844. Hubacova, L.; Hubac, M.; Strelka, F., et al. **Influence of Smoking on the Health State of Working Women in Slovakia.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 143-148.

Smoking effects on the health status of 4,000 Slovakian working women aged 16 to 67 years were studied in 13 industrial plants and 2 hospitals. In addition to history of previous diseases, data were collected on years of smoking and number of cigarettes smoked/day. The 3,155 factory workers, 424 clerical workers, and 421 medical workers were further subdivided into 832 current smokers, 194 ex-smokers, and 2,974 nonsmokers. Proportion of smokers was 22 percent of factory workers, 33 percent of clerical workers, and 42 percent of nurses. In the youngest age group (<30 years) differences between smokers and nonsmokers were found for dizziness and fainting ($p < 0.05$), neuroticism, chronic inflammation of the upper respiratory tract, gastritis, duodenitis and chronic intestinal inflammation, and spontaneous abortion. In the group aged 30 to 45 years, differences were registered for sleep disturbances, neuroticism, chronic inflammation of the upper respiratory tract ($p < 0.001$), chronic bronchitis ($p < 0.05$), complications in pregnancy, and premature delivery. In those 45 years of age and older, differences between smokers and nonsmokers were found in twice as many indices: subjective difficulties ($p < 0.05$), frequent headaches, dizziness and fainting, neuroticism, chronic inflammation of the upper respiratory tract, chronic bronchitis, hypertonic disease, peptic ulcer, gastritis, duodenitis and chronic intestinal inflammation, complications in pregnancy, spontaneous abortion, and premature delivery.

86–0845. Koken, Y.; Michiko, N.; Shoshi, B., et al. **Kitsuen, Kinen no Hito Naibunpi Kino ni Oyobosu Eikyo. [Effects of Cigarette Smoking on Endocrine Function in Man].** *Japanese Journal of Anesthesiology* 34(8):1105-1114, August 1985, Japanese.

The pituitary—adrenal axis may be stimulated by habitual smoking, and cessation, even of short duration, may be stressful for habitual smokers. Effects of cigarette smoking on endocrine function through measurements of plasma concentrations of adrenocorticotropic hormone (ACTH), cortisol, β-endorphin-like-immunoreactivity (β-ELI), prolactin (PRL), growth hormone (HGH), epinephrine, norepinephrine, dopamine, carboxyhemoglobin (COHb), and methemoglobin (Met Hb) were studied in 23 habitual smokers and 21 nonsmokers. In habitual smokers, plasma cortisol, epinephrine, and PRL levels increased significantly following smoking. Baseline levels of COHb and Met Hb were significantly higher, COHb levels were increased, and plasma norepinephrine concentrations tended to increase, suggesting that smoking may stimulate the pituitary-adrenal axis. With cessation of smoking, plasma β-ELI, PRL, epinephrine, and COHb levels decreased significantly. However, plasma concentrations of norepinephrine increased slightly, but decreased again following smoking, suggesting that the pituitary—adrenal axis was not stimulated during abstention from smoking. Plasma concentrations of cortisol, β-ELI, PRL, and COHb increased significantly after 4 hours of smoking cessation. Plasma ACTH and dopamine levels did not change throughout the experiments. (Auth. Abs. Mod.)

86–0846. Kreiger, N.; Hilditch, S. **Cigarette Smoking and Estrogen-Dependent Diseases. (Letter).** *American Journal of Epidemiology* 123(1):200, January 1986.

The hypothesis that cigarette smoking is a risk factor for osteoporosis (and therefore bone fracture) in postmenopausal women (*American Journal of Epidemiology* 119(1):9-22, January 1984) needs to be tested against other data important in the etiology of fracture. When postmenopausal women with hip fracture were compared with two hospitalized control groups (traumatic and nontraumatic admissions), cigarette smoking (ever vs. never) did not appear to have a significant effect on risk of fracture. Estimates of relative risk were 1.27 for cases compared with trauma controls and 1.29 for cases compared with nontrauma controls in models that included age, Quetelet index, months of breast feeding, ovariectomy, and menopausal estrogen use. Risk estimates for cigarette smoking were very stable in different models: inclusion or exclusion of the other variables did not affect the relationship between smoking and fracture. (Age was always included in the models.) The one exception was the Quetelet index. When this variable was deleted, the risk estimate for smoking increased to 1.77 for cases vs. trauma controls and to 1.54 for cases vs. nontrauma controls; however, neither odds ratio was statistically significant. See also 84-0849.

86–0847. Kulikauskas, V.; Blaustein, D.; Ablin, R.J. **Cigarette Smoking and Its Possible Effects on Sperm.** *Fertility and Sterility* 44(4):526-528, October 1985.

Mutagenic consequences of cigarette smoke condensates were investigated in a study of semen obtained from 238 subjects (103 smokers), aged 19 to 32, who had abstained from alcohol, barbiturates, and sexual activity for 3 to 7 days. Sperm quality was judged by density (number), motility, and morphologic abnormalities. Spermatozoa from smokers had significantly decreased density and motility ($p<0.001$) compared with sperm from nonsmokers. Analysis of individual sperm counts found that 77 smokers (75 percent) had a sperm density of <40 X 10^6 sperm/mL (lower limit of normal range), which was twice as many as among nonsmokers (26 percent). Morphologic abnormalities, particularly bicephalia, although prevalent among individual smokers, did not differ significantly ($p>0.9$) between smokers and nonsmokers. It is suggested that decreases in sperm density and motility in cigarette smokers may reflect smoke condensate-induced mutagenic spermatogenital alterations. (Auth. Abs. Mod.)

86–0848. Melton, L.J., III; Riggs, B.L. **Smoking. (Letter).** *New England Journal of Medicine* 314(3):180-181, January 16, 1986.

A review of the health effects of smoking (*New England Journal of Medicine* 313(8):491-498, August 22, 1985; 313(9):555-561, August 29, 1985) failed to list smoking as a potential risk factor for osteoporosis. In an unpublished study, men who smoked had a 2.3-fold increase in risk of vertebral fracture and a 2.1-fold increase in risk of hip fractures. Similar findings have been reported for vertebral, hip, and forearm fractures in women. Smoking appears to be an independent risk factor for osteoporosis and subsequent fracture, which are an increasingly serious threat to health of middle-aged and elderly persons. Costs associated with osteoporosis are estimated at more than 6 billion dollars/year in the United States, and are expected to rise dramatically with the aging of the population. Smoking may ultimately contribute as much to morbidity, mortality, and social costs associated with osteoporosis and fractures as it now does to cancer and cardiorespiratory disease. See also 86-0067, 86-0649.

86–0849. Model, D. **Smoker's Face: An Underrated Clinical Sign?** *British Medical Journal* 291:1755,1760-1762, December 1985.

Telltale signs of smoking in a smoker's face are judged by (1) radiating lines of wrinkles from lips or eyes, deep lines in cheeks, or numerous shallow lines in the cheeks or lower jaw; (2) gauntness, prominent facial bones, leathery or rugged appearance, or an atherosclerotic look; (3) atrophic, gray pigmentation; or (4) plethoric, slightly orange, purple, and red complexion. Although a relationship between smoking and complexion was first suggested as early as 1856, it has not been generally acknowledged as a physical sign nor has it been mentioned in any of standard medical textbooks. In a prospective survey of 41 current smokers, 37 ex-smokers, and 38 nonsmokers attending a general medical outpatient clinic, approximately half of the smokers (>10 years) were identified by facial features. The "smoker's face" was present in three (8 percent) of ex-smokers who had smoked cigarettes for 10 years or more at some time in the past and in none of the nonsmokers. Association of the smoker's face with current smoking (>10 years) was significant ($p<0.001$) and remained even after controlling for age, social class, exposure to sunlight, recent changes in weight, and estimated lifetime consumption of cigarettes. It is clinically and psychologically important that the face can be so profoundly affected by smoking. (Auth. Abs. Mod.)

86–0850. Newell, G.R.; Mansell, P.W.A.; Wilson, M.B., et al. **Risk Factor Analysis Among Men Referred for Possible Acquired Immune Deficiency Syndrome.** *Preventive Medicine* 14(1):81-91, January 1985.

Preventive practices for male homosexuals to reduce risk for developing acquired immune deficiency syndrome (AIDS), Kaposi's sarcoma (KS), and/or opportunistic infections (OI), include (1) cessation of smoking, marijuana use, and nitrite inhalation; (2) reduction in number of anonymous sexual partners to decrease risk of sexually transmitted diseases; and (3) avoidance of fisting. Odds ratios (OR), calculated as an estimate of risk for 13 KS and 18 OI patients, were compared with those of 29 symptom-free (SF) individuals. Significantly elevated ORs ($p<0.05$) were found for cigarette smoking (3.4) and marijuana use (3.7). Smoking, reported by 51.6 percent of KS/OI patients and 24.1 percent of SF patients, was a significant risk factor for KS/OI. The *N*-nitroso products in cigarettes may act synergistically with other chemical carcinogens. Marijuana smoking is a newly reported association with a dose—response gradient. Marijuana smoke produces toxins that depress alveolar macrophage bacteriocidal activity, with toxic effects comparable to tobacco smoke on mitotic division and genetic material of human lung cells in culture. Daily marijuana smoking causes significant functional respiratory impairment similar to early chronic obstructive lung disease. Impairment of T-lymphocytes and inhibition of cellular-mediated immunity have also been found in marijuana smokers. ORs for other risks included nitrite inhalation (5.5), frequenting bathhouses (7.6), prior syphillis (3.4), and fist-rectal sexual practices (3.5). (Auth. Abs. Mod.)

86–0851. Nicholson, P.A. **A Multicenter International Controlled Comparison of Two Dosage Regimes of Misoprostol and Cimetidine in the Treatment of Duodenal Ulcer in Out-Patients.** *Digestive Diseases and Sciences* 30(11):171S-177S, November 1985.

A multicenter international study of 703 patients with endoscopically proven acute duodenal ulcers showed consistently that nonsmokers had higher healing rates than smokers. A double-blind parallel group of patients were allocated randomly to treatment for 4 weeks with either misoprostol 50 μg (138 smokers), misoprostol 200 μg (139 smokers), or cimetidine 300 mg (156 smokers). After 2 weeks, endoscopic, clinical, and laboratory assessments were made in the patients, who were similar with regard to age, sex, and occupation. Therapeutic success was defined as complete healing of all ulcers, determined by endoscopic examination. On an intent to treat basis, including all losses to followup and withdrawals as treatment failures, cure rates in the misoprostol 50 μg, misoprostol 200 μg, and cimetidine groups were 41, 60, and 67 percent, respectively. There was no statistically significant difference between the misoprostol 200 μg and the cimetidine 300 mg groups ($p=0.11$), and both were significantly better than the low dose misoprostol group ($p<0.001$). All three treatments were well tolerated and severe adverse events were rare. (Auth. Abs. Mod.)

86-0852. Niemela, S. **Duodenogastric Reflux in Patients With Upper Abdominal Complaints or Gastric Ulcer.** *Scandinavian Journal of Gastroenterology* 20(Supplement 115):1-56, 1985.

The incidence of duodenogastric reflux in patients with abdominal complaints and the relationship between the nature and extent of reflux and abdominal complaints and use of drugs, smoking, coffee and alcohol consumption, and histological changes in the gastric mucosa were examined in 107 patients with abdominal complaints and 33 patients with gastric ulcer. Smokers and habitual coffee or alcohol drinkers did not differ from nonsmokers and coffee and alcohol abstainers with respect to isotope reflux, nor was the extent of smoking or coffee or alcohol consumption significantly related to reflux findings. Intragastric bile acid concentrations of >1,000 μmol/L were significantly more common in alcohol abstainers than in consumers, whereas smokers and coffee drinkers did not differ significantly from nonsmokers and nondrinkers. The extent of smoking, alcohol consumption, or coffee drinking did not correlate significantly with intragastric bile acid concentrations. No significant relationship between intragastric lysolecithin concentrations and smoking or consumption of coffee or alcohol was observed.

86-0853. Ogle, C.W.; Cho, C.H.; Wong, S.H. **The Effect of Nicotine on Ethanol-Induced Gastric Ulcers in Rats.** *Experientia* 41(9):1140-1141, September 1985.

Nicotine in drinking water (5 or 25 μg/mL) over a 10-day period dose-dependently increased lesion formation and worsened ethanol-induced ulceration in rat stomachs. The investigation of the direct influence of chronic nicotine pretreatment and interaction between nicotine and ethanol on the gastric mucosa in rats observed a statistically significant effect with higher doses of nicotine (simulating heavy smoking). Lesions in gastric glandular mucosa were in the form of petechiae, but small hemorrhagic ulcers were sometimes observed. Ethanol administration produced extensive hemorrhagic ulceration in gastric glandular mucosa that was markedly potentiated by nicotine pretreatment, reaching significance at 25 μg/mL concentration. Nicotine in drinking water did not wholly reflect effects of smoking on gastric lesion formation because other factors such as tar, which is also swallowed, must be considered. Nevertheless, current findings indicate that nicotine itself has ulcerogenic potential.

86-0854. Parmar, N.S.; Tariq, M.; Ageel, A.M. **Effect of Nicotine, Alcohol and Caffeine Pretreatment on the Gastric Mucosal Damage Induced by Aspirin, Phenylbutazone and Reserpine in Rats.** *Japanese Journal of Pharmacology* 39(1):1-6, September 1985.

Nicotine, alcohol, and caffeine were associated with pathogenesis of gastric ulcers and implicated as modifying factors in genesis of gastric lesions induced by aspirin, phenylbutazone, and reserpine in rats. The effects of nicotine (2.5 mg/100 mL), alcohol (25 percent v/v), and caffeine (30 mg/100 mL base) and their combination fed via drinking water ad libitum for 21 days were studied on gastric mucosal damage induced by aspirin, phenylbutazone, and reserpine in rats. No visibly discernible gastric lesions were produced when given alone; concurrent administration produced some, but far less severe injury to gastric mucosa than lesions induced by any ulcerogenic drug. Pretreatment with nicotine, alcohol, and caffeine and their combination resulted in significant augmentation of gastric lesions produced by aspirin, phenylbutazone, and reserpine. (Auth. Abs. Mod.)

86-0855. Selzer, J.A.; Long, M.A. **Smoking. (Letter).** *New England Journal of Medicine* 314(3):180, January 16, 1986.

The phenomenon of lower blood levels of prescribed medications in smokers, which was not included in a review on health effects of smoking (*New England Journal of Medicine* 313(8):491-498, August 22, 1985; 313(9):555-561, August 29, 1985), is probably the result of substances in cigarette smoke that cause higher rates of drug metabolism by induction of enzymes in intestinal mucosa or liver. Psychiatrists have detected lower blood levels of antidepressant and neuroleptic medications in patients who smoke, although the clinical importance of this is not yet clear. Theophylline levels are lower in smokers, while higher blood levels of propranolol have been reported in patients treated for angina who stopped smoking. Physicians should be aware that smoking may hamper the pharmacologic treatment of a disease process caused or exacerbated by cigarette smoking. See also 86-0067, 86-0649.

86-0856. Valentine, J.A.; Scott, J.; West, C.R., et al. **A Histological Analysis of the Early Effects of Alcohol and Tobacco Usage on Human Lingual Epithelium.** *Journal of Oral Pathology* 14(8):654-665, September 1985.

Tobacco and alcohol use effects on human lingual epithelium in macroscopically normal tongues from 161 necropsies revealed qualitative differences between heavy smokers and heavy drinkers compared with nonsmokers and light drinkers. Two types of lingual epithelium were investigated, based on age, sex, four levels of alcohol consumption, and four levels of tobacco consumption (nonsmoker, <11 cigarettes/day, 11 to 24 cigarettes/day, and >24 cigarettes/day). Tobacco and alcohol were each associated with reduction in epithelial thickness brought about by a reduction in the maturation layer. By contrast, the progenitor layer increased in size from hypertrophy rather than hyperplasia. Epithelium changes were more severe with alcohol, and appeared to be nonspecific reactions to local toxic effects of alcohol and tobacco. No significant interaction was noted between alcohol and tobacco use. (Auth. Abs. Mod.)

See also, **86–0922**

BEHAVIORAL AND PSYCHOLOGICAL ASPECTS

86–0857. Baragiola, A. **Por Que Fuma Usted? Un Estudio Motivacional de Estudiantes Secundarios Tecnicos—1984. [Why Do You Smoke? A Motivational Study of Secondary Technical Students—1984.]** *Revista Argentina de Analisis, Modificacion y Terapias del Comportamiento* 1(1):35-42, April 1985, Spanish.

Motivations to smoke and smoking habits were surveyed in a random sample of 85 student smokers in a secondary technical school in Mendoza, Argentina, using the No. 3 Smoking Test Kit published by the U.S. National Cancer Institute. Average age was 24 years and average cigarette consumption was 13/day for approximately 7 years. Parameters polled included age, personal smoking history, family smoking history, and motivational factors such as stimulation, manipulation, pleasure/relaxation, tension reduction, psychological addiction, and habit. Relaxation and pleasure were the most common reasons for smoking, followed by tension, psychological addiction, manipulation, stimulation, and habit. A significant proportion (76 percent) had family members who smoked. The influence of parental and legislative authority in the smoking habits of the general population and in smoking prevention are emphasized. It is recommended that more extensive, long-term studies be undertaken to establish an effective antismoking campaign.

86–0858. Charbonneau, L. **Smoking or Health: How Long Can Nurses Ignore the Facts?** *Canadian Nurse* 81(7):27-32, August 1985.

Nurses not only are the least active among health professionals in combating smoking, but also are the most likely to be its victims. Surveys have found that (1) in Britain, 48 percent of hospital nurses smoke; (2) in Australia, 55.7 percent of nurses are smokers; (3) in New Zealand, 48 percent of psychiatric and male general duty nurses smoke; and (4) in the United States, the percentage of nurses who smoked increased from 37 percent in 1967 to 39 percent in 1975 (compared with 29 percent of all U.S. women). Nurses more frequently than other professional women stated that they found it difficult to quit smoking. U.S. nurses make up half of the employees in health occupations and failure to act as nonsmoking exemplars has a particularly negative impact on patients and the public. Most hospitals have policies prohibiting smoking in patient care areas, but total bans on smoking in hospitals have run into resistance. Often patient lounges are designated as smoking areas, but no provision is made for a smoke-free lounge elsewhere. Smoking is usually allowed in the cafeteria, waiting areas, and often even at nursing stations. Some nursing associations in the Canadian provinces are supporting a ban on smoking in the workplace.

86–0859. Charlton, A.; Gillies, P.; Ledwith, F. **Variations Between Schools and Regions in Smoking Prevalence Among British Schoolchildren—Implications for Health Education.** *Public Health (London)* 99(4):243-249, July 1985.

Surveys of smoking habits among schoolchildren aged 9 to 16 years in the north of England, Sheffield, and the east of Scotland were conducted concurrently with a national survey of the Office of Population Censuses and Surveys (OPCS) in 1982 to determine regional and school differences in age of smoking onset and overall smoking prevalence. Random samples of schools were drawn to provide 10 and 5 percent samples of children on school rolls in northern England and Sheffield, respectively; in Scotland, a probability sample of secondary schools was drawn within each local authority area. Although an increasing trend in prevalence of smoking or of ever smoking was observed with age in all three regions, differences were observed between regions at specific ages: there was a greater prevalence of regular smoking among boys aged 14 to 15 years ($p<0.001$) and boys aged 15 to 16 years ($p<0.05$) in the Northern sample than in the Sheffield sample. Also, while overall prevalence of ever smoking was similar in all regions, considerable differences were observed between individual schools. Overall smoking prevalence estimates were in broad agreement with the OPCS national study; however, regional and school differences observed suggest that each school may need to conduct its own survey to determine the optimal age for education about smoking. (Auth. Abs. Mod.)

86–0860. Cherek, D.R. **Effects of Acute Exposure to Increased Levels of Background Industrial Noise on Cigarette Smoking**

Behavior. *International Archives of Occupational and Environmental Health* 56(1):23-30, 1985.

Results indicate that cigarette smoke-induced reduction of human aggressive responding elicited by aversive stimuli may have contributed to the changes in cigarette smoking behavior observed. The effects of variations in background industrial noise on cigarette smoking behavior were investigated in seven male smokers while they performed a simulated work task. During the baseline condition, subjects were exposed to ambient background noise of 60 decibels (dB) until the number of cigarette puffs/session stabilized. During the experimental condition, tape-recorded industrial noise at levels of 70, 80, or 90 dB was presented via headphones while subjects performed a monetary reinforced lever-pressing task. Number of cigarettes smoked/session did not change when 70 dB noise was presented, but consistent nonsignificant increases were observed at 80 and 90 dB. The number of cigarette puffs increased substantially as the decibel level of noise increased ($p<0.025$), with large increases evident at the 90 dB level. Increases in total puff duration with increasing noise levels were the most significant changes observed ($p<0.005$). At 90 dB, mean total puff duration for all subjects increased by 34.2 percent.

86-0861. Chronic Diseases in Canada. **Global Per Capita Consumption of Manufactured Cigarettes, 1984.** *Chronic Diseases in Canada* 6(3):62-63, December 1985.

Worldwide, the United Arab Emirates (U.A.E.) led in consumption of manufactured cigarettes in 1984 with 5,900 per capita, which was almost double that of Cyprus, the second highest consumer (2,900 per capita). In a survey of 127 countries, the United States placed sixth with 2,600, following Cuba (2,900), Greece (2,800), and Japan (2,600). The other countries among the top 16 consumers (>2,000 per capita) were Hungary, Canada, Yugoslavia, Poland, Iceland, Australia, Austria, Singapore, West Germany, and Spain. The U.A.E., Greece, Australia, Singapore, Hungary, Yugoslavia and Poland reported higher consumption in 1984 than in 1983. Apparent declines were noted in the other countries. Following a slight decline from 1982 to 1983, worldwide consumption (defined as total production) increased by 3 percent in 1984, from 4.551 to 4.695 trillion pieces. Using a midyear world population estimate of 4.769 billion persons, this overall level of consumption represents 984 manufactured cigarettes for each person in the world in 1984. High consumption in the U.A.E. may be the result of a duty-free concession at Dubai and a population of mobile foreign guest workers, while consumption in Singapore and the colonial enclave at Macao may be related to large-scale sales to visitors and to foreign military personnel, respectively. Per capita consumption for the 127 countries is tabulated.

86-0862. Chronic Diseases in Canada. **Percentage of Young Canadians Who Smoke Daily, 1982-85.** *Chronic Diseases in Canada* 6(3):61, December 1985.

More young adult women in Canada were smoking in 1985 than in 1982, according to surveys of adolescents and young adults, while the number of 12- to 19-year-olds smoking daily over the 3-year sampling period remained the same (21 to 25 percent in 1985). Daily smokers among women aged 20 to 24 years increased from 40 percent in 1983 to 52 percent in 1985, and among women aged 24 to 29 years, from 34 percent to 47 percent. While there is a substantial amount of recruitment to daily smoking before the age of 17, data suggest that there is another substantial increase in number of female smokers after age 20. Among adolescents aged 18 and 19 years in 1982, 41 percent of males and 37 percent of females were smokers. In 1985, 28 percent of males and 36 percent of females were regular smokers. Approximately 2,000 Canadians aged 12 to 29 years were surveyed about smoking habits in February 1983, 1984, and 1985; 1,500 persons aged 12 to 19 years were asked the same question in May 1982.

86-0863. Croft, J.B.; Hunter, S.M.; Webber, L.S., et al. **Cigarette Smoking Behavioral Distinctions Between Experimental Nonadopters and Adopters in Children and Adolescents—A Consideration of Transitional Smoking Experience: The Bogalusa Heart Study.** *Preventive Medicine* 14(1):109-122, January 1985.

A questionnaire to examine behavior, attitudes, and beliefs related to cigarette use was administered to 2,880 children (aged 8 to 17) in a biracial community. Children who had experimented with cigarettes but did not adopt the habit ($n=848$, experimental nonadopters) and children who continued to smoke ($n=410$, adopters) were identified and characterized. Followup behavior was examined 2 years later. Adopters were more likely to (1) have friends and family members who smoked, (2) have purchased their first cigarettes, and (3) believe smoking to be pleasurable for themselves and others. They were less likely to consider smoking harmful. Adopters who maintained smoking behavior 2 years later had, during the initial survey, reported having more friends who also smoked and were more likely to believe smoking to be enjoyable. Experimental nonadopters were more likely to try the first cigarette alone, reported having fewer friends and family members who smoked, and believed greater health risks to be associated with cigarette use. Experimental nonadopters who maintained nonsmoking behavior 2 years later, especially in the older cohort, exhibited higher agreement with the negative consequences of cigarette smoking (health beliefs) and theories concerning smoking behavior of others. (Auth. Abs.)

86-0864. Gorski, T.; Stavrou, S. (Editors). **Rozpowszechnienie Nalogu Palenia Tytoniu Wsrod Roznych Grup Ludnosci. [Smoking Prevalence Among Different Groups of the Population.]** Proceedings of the Second Antismoking Symposium of Socialist Countries on "Protection of Children and Adolescents From Smoking," Lodz, October 9-11, 1984. *Przeglad Przeciwtytoniowy*, No. 4. Warsaw, Polish Antismoking Society, National Antismoking Center, 1984, 138 pp., Polish.

Proceedings of an antismoking symposium held in Lodz, Poland, that emphasized the protection of children and adolescents in Socialist countries from smoking, are presented. A large part of the meeting was devoted to a discussion of the prevalence of smoking among different populations and included specific information on the frequency and distribution of smoking in Poland, smoking among youth, and the prevalence of smoking among high school students in Wroclaw, middle school students in the Bielsk region, and children and adolescents in experimental schools. Data from surveys of smoking among adults (government nurses, doctors, pharmacists, pregnant women, and the population of Krakow) were also discussed. Other topics included the main components of a long-term antismoking program in Poland (1983-2000), smoking prevalence among Soviet children and adolescents and methods of prevention, social and hygienic aspects of antismoking education directed toward Soviet children and adolescents, aspects of health education in these groups, smoking behavior and reasons for cessation in Bulgaria, smoking prevalence among children and adolescents in Czechoslovakia, and a smoking prevention program in Czechoslovakia.

86–0865. Hay, D.R. **The Census and Smoking. (Letter).** *New Zealand Medical Journal* 98(748):656, August 1985.

With the proposed discontinuation of a question on smoking in the New Zealand census, an important source of scientific data on cigarette smoking will be lost. More than 98 percent of New Zealanders answered the question in the 1976 and 1981 censuses, making a mockery of the Government Statistician's arguments that smoking habits are highly personal and that some regard the question as an invasion of privacy. The World Health Organization, among others, supported retention of the question about smoking. The Government Statistician (and the tobacco industry) stressed underreporting of amount of smoking in defending discontinuation, and questioned the accuracy of any established statistics in this area. The strength of the census material is that it does not suffer from nonrepresentative sampling of the population. The argument that the growing negative public attitude to smoking makes the question less desirable than in the past is also an argument for retaining the question. It is important to monitor the rapid changes in attitudes and behavior. In addition, coronary disease mortality is declining and there are hints that lung cancer death rates may be doing the same. It is essential that data be collected to help interpret these trends.

86–0866. Herling, S.; Kozlowski, L.T. **The Interaction of Pharmacological and Psychological Determinants of Tobacco Use.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health. 1983, pp. 131-135.

The addictive effects of nicotine have been difficult to demonstrate experimentally in humans and in animals; however, it has become clear that behavioral history and current access conditions (i.e., the way in which injections are scheduled to occur) are important determinants of behavioral effects. Results in animals suggest that nicotine might control smoking behavior in humans by past and current environmental conditions. One way in which environmental conditions have been shown to affect responding maintained by nicotine in animals has been in studies of second-order schedules. Under this method, lever pressing produces environmental stimuli (e.g., brief visual stimuli) that are only occasionally associated with intravenous injection of drug or presentation of some other reinforcing stimulus. Behavior enhancement by an environmental stimulus occurred whether drug or food maintained the behavior or whether the drug maintaining the behavior was cocaine, morphine, or nicotine. In one human subject responding to intravenous injections of nicotine, response rates under a second-order schedule were almost three times higher than under a schedule in which second-order stimuli were not presented. An understanding of the contribution of various psychological and pharmacological influences in individual smokers may be important in suggesting appropriate treatment strategies.

86–0867. Holmqvist, P. **Smoking Habits in School-Children With 2 Years Follow-Up.** *Child: Care, Health and Development* 11(3):151-158, May-June 1985.

Two-year followup of 12- to 15-year-olds in Sweden, surveyed for attitudes and reactions toward smoking, confirmed that antismoking campaigns may have a positive effect on adolescent attitudes toward smoking. In original interviews with 413 pupils, 13.3 percent of boys and 9.5 percent of girls were smokers. Among 15-year-olds, 21 percent were smokers, whereas none of the 12- to 13-year-olds smoked. After 2 years, 10.5 percent of those who were not smoking at 13 years of age were smokers. However, smoking among pupils aged 14 to 15 years declined from 17.8 percent in 1981 to 12.5 percent in 1983, mainly reflecting the decline among boys from 21.6 percent to 9.5 percent. Smoking among girls aged 14 to 15 years increased from 14.3 percent to 16.4 percent. Initially, 8.7 percent were heavy smokers (>15 cigarettes/day) and 30 percent were light smokers (<5 cigarettes/day). At followup, 60 percent were light smokers. Originally more boys (22) than girls (9) smoked every day, but followup data showed both sexes smoked equal amounts. Concern for health was the main reason for quitting, particularly the risk that impaired physical fitness might preclude participation in sports, followed by a preference for nonsmoking friends. Advertising and health information promoted by the antitobacco campaign influenced 23 percent and at followup 26 percent of the pupils. (Auth. Abs. Mod.)

86–0868. Howard, J.H.; Cunningham, D.A.; Rechnitzer, P.A. **Personality as a Moderator of the Effects of Cigarette Smoking on Coronary Risk.** *Preventive Medicine* 14(1):24-33, January 1985.

Personality as a possible moderator of the effect of smoking on coronary risk was investigated in 278 middle-aged men (31 percent smokers) in high-stress positions in financial and manufacturing organizations. Coronary risk variables were cigarette smoking, systolic and diastolic blood pressure, cholesterol, triglycerides, uric acid, and Type A behavior. Smokers, slightly younger and less educated than nonsmokers, consumed from 1 to 60 cigarettes/day. Among smokers, the personality dimension entitled dependence/independence appeared to have a significant moderating effect on the relationship between the amount smoked and elevations of diastolic blood pressure, cholesterol, triglycerides, and uric acid. It is suggested that moderating effects of this personality dimension, sometimes called "Promethean Will," may also be attributable to either the differential effect of coincident dietary behavior or variation in sympathetic response. Whether such personality dimensions have associated dietary effects or might moderate the relationship between amount smoked and catecholamine response are areas requiring further investigation. (Auth. Abs. Mod.)

86–0869. Johnston, L.D.; O'Malley, P.M.; Bachman, J.G. **Use of Licit and Illicit Drugs by America's High School Students 1975-1984.** U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse, DHHS Publication No. (ADM) 85-1394, 1985, 159 pp.

Data from the eighth annual report on drug use and related attitudes found that (1) personal health concerns and peer disapproval were factors in the decline of daily cigarette smoking among America's high school seniors (from 26.9 percent in 1975 to 18.7 percent in 1984); (2) daily use has been declining since 1977; (3) fewer males (11.1 percent) than females (12.9 percent) were regular smokers of half a pack/day; (4) only 6.5 percent of college-bound seniors smoked >9 cigarettes/day compared with 20 percent of those not planning to attend college; and (5) 29 percent had smoked cigarettes in the prior month. Only 19 percent reported that most or all of their friends were smokers and the proportion reporting that their friends would disapprove of them smoking a pack/day rose from 64 percent in 1975 to 74 percent in 1984. Although there were only slight differences between males and females among those who smoked more or less than half a pack/day, 32 percent of females reported smoking at least once in the prior 30 days compared with only 26 percent of males. Use of illicit drugs declined, with marijuana use dropping from 37 percent in 1979 to 25 percent in 1984. However, nearly two-thirds of all American young people (62 percent) had tried an illicit drug before finishing high school, 1 in every 20 seniors smoked marijuana on a daily basis, and 16 percent had smoked marijuana for at least a month at some time in their lives. Fully 40 percent illicitly used drugs other than marijuana. About 1 in 20 drank alcohol daily, and 39 percent had had five or more drinks in a row at least once in the past two weeks. Prevalence of licit and illicit drug use and trends since 1975 are reported, including grade level at first use, trends in use at earlier grade levels, intensity of drug use, attitudes and beliefs among seniors concerning use of various types of drugs, and perceptions of certain relevant aspects of the social environment.

86–0870. Kandel, D.B.; Yamaguchi, K. **Developmental Patterns of the Use of Legal, Illegal, and Medically Prescribed Psychotropic Drugs From Adolescence to Young Adulthood.** U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute on Drug Abuse, NIDA Research Monograph 56, 1985, pp. 193-235.

The natural history of drug involvement through age 25 in a general population sample is discussed, based on a followup survey of 1,325 young adults initially interviewed as high school students 9 years earlier. Initiation of legal drug use (cigarettes and alcohol) and of most illicit drugs (except cocaine) peaks at 18 years of age and declines sharply thereafter. Initiation of use of prescribed psychoactive drugs increases sharply at age 18 and persists at an increasing rate through the mid-20s. Stabilization in use of licit and illicit drugs occurs within 1 year after high school graduation. Periods of highest use of alcohol and marijuana decline sharply after age 20 or 21, possibly reflecting a process of psychosocial maturation coinciding with assumption of roles of adulthood. The contrast with use of cigarettes, where rates rise through the end of the period of observation (age 25), is striking. Analyses also indicate the importance of cigarettes in patterns of progression among women: (1) cigarettes can precede marijuana in the absence of alcohol among women, whereas alcohol, even in the absence of cigarettes, consistently precedes marijuana use among men; (2) cigarettes also precede use of illicit drugs among women, but not among men; and (3) among women, use of prescribed psychoactive drugs can be initiated in the absence of prior experimentation with marijuana if cigarettes have been used, but alcohol is more important than cigarettes among men as an experience prior to marijuana use. For men, use patterns show that alcohol precedes marijuana; alcohol and marijuana precede other illicit drug use; and alcohol, cigarettes, and marijuana precede use of prescribed psychoactive drugs. For women, use of alcohol or cigarettes precedes marijuana; alcohol, cigarettes, and marijuana precede use of other illicit drugs; and use of alcohol and either cigarettes or marijuana precedes use of prescribed psychoactive drugs. Findings have potentially important policy implications for development of preventive and educational efforts to reduce initiation into use of cigarettes and alcohol, and thus reduce future involvement with illicit drugs.

86–0871. Knott, V.J. **Effects of Tobacco and Distraction on Sensory and Slow Cortical Evoked Potentials During Task Performance.** *Neuropsychobiology* 13(3):136-140, 1985.

Sensory and slow cortical evoked potentials (EP) of 16 female smokers were investigated under two conditions in separate sham and real smoking sessions: (1) a nondistraction (ND) condition consisting of a constant fore-period (i.e., a single-choice reaction time situation with a tone (S_1)/light (S_2) key press sequence), and (2) a task distraction (TD) condition identical to ND with the addition of a short-term memory task consisting of four letters presented within the S_1-S_2 interval with the requirement that subjects repeat after key press to the light. Two individual EP peaks, N_1 and P_2, were involved in the amplitude analysis of S_1 and S_2 stimuli. In addition, the amplitude of the slow contingent negative variation (CNV) developing between S_1 and S_2 was analyzed. Comparison of sham and real smoking effects within groups showed significant tobacco-induced CNV elevations and P_2 amplitude reductions in response to S_1 that varied according to pre-experimental expired air carbon monoxide (CO) levels of smokers. Smokers with low CO levels evidenced tobacco-induced P_2 reductions and CNV increments during the ND condition while subjects with high CO levels displayed similar cortical changes in the TD conditions. Results are discussed in relation to the role of nicotine and to improved attention and information processing. (Auth. Abs. Mod.)

86–0872. Knott, V.J. **Tobacco Effects on Cortical Evoked Potentials to Distracting Stimuli.** *Neuropsychobiology* 13(1/2):74-80, 1985.

Auditory evoked potential (EP) components, which might be sensitive to tobacco and thus provide a basis for generating more specific hypotheses concerning tobacco-induced EP changes, were identified and described for 16 female smokers during nontask and task performance situations. Four individual EP peaks, P_1, N_1, P_2, and N_2, and three peak-to-peak measures, P_1-N_2, N_1-P_2, and N_2-P_2, were included in amplitude analysis during both task and nontask conditions and in separate smoking and nonsmoking sessions. Tobacco significantly interacted with intensity and task condition to produce both increases (P_1, N_1) and decreases (P_2, P_2-N_2) in amplitudes of EP peaks. Results are discussed in relation to cortical arousal and information processing effects of tobacco, and specific areas for future research are recommended. (Auth. Abs. Mod.)

86–0873. Kofoed, L.L. **OTC Drug Overuse in the Elderly: What to Watch for.** *Geriatrics* 40(10):55-58, 60, October 1985.

One in five men over the age of 60 is a regular smoker, and heavy smoking in older men is strongly associated with excessive alcohol consumption. Drug use patterns, side effects, and interactions of various over-the-counter (OTC) drugs are discussed. Just as specific age-related factors increase OTC drug use and risk, so age also complicates diagnosis. Diagnosis of OTC drug misuse or abuse can be made only if clinicians have an index of suspicion, seek multiple sources of information, interview family members, obtain urine toxicologies, and critically analyze routine laboratory data. Nicotine dependence is usually self-evident, i.e., stained teeth and fingers. Clinicians should also be alerted by a history of alcohol abuse. The side effects of smoking are oral and lung cancers, cardiovascular disease, osteoporosis, weight loss, decreased muscle strength, decreased pulmonary function, physical dependence, and withdrawal. Nicotine increases the metabolic rate of theophylline.

86–0874. Lancet. **Young Smokers.** *Lancet* 2(8469/8470):1442-1443, December 21-28, 1985.

Antismoking messages directed at adult smokers took 20 years to achieve a response, and current emphasis on a 34 percent decline in adult smoking is obscuring the fact that more children and young people are beginning to smoke. Of the 22 percent of all British secondary school pupils who smoke, 13 percent smoke about 50 cigarettes/week. Surveys show that smoking among schoolchildren increases to 40 percent by the fifth year of secondary school, at which time there is also a sharp increase in the number of female smokers. The Department of Health and Social Security reports that 11- to 16-year-olds smoke 70 to 90 million (pounds sterling) worth of cigarettes/year. Children cannot hear an antismoking message if it is overridden by messages (at the point of supply and at sports events) that urge them to smoke. An outright ban on all cigarette advertising and promotion through industry cooperation, as urged by the British Medical Association, will most likely be resisted by the vested interests of the industry. Health education can only modify destructive behavior patterns, whereas antismoking education begun at an earlier age might prevent their establishment. It is recommended that parents support the Health Education Council in concentrating the antismoking message at an even younger age group than the present 11- to 16-year-olds.

86–0875. McMorrow, M.J.; Foxx, R.M. **Cigarette Brand Switching: Relating Assessment Strategies to the Critical Issues.** *Psychological Bulletin* 98(1):139-159, July 1985.

Critical research issues regarding switching to low-tar and low-nicotine (low-T/N) brand cigarettes include risk reduction, nicotine regulation, and compensation. Various assessment strategies are related to these issues by (1) tracing the development of current assessment strategies and clarifying the relative strengths of mouth-level, machine-based, behavioral, and biochemical measures; (2) reviewing a variety of biochemical assessments including carbon monoxide, thiocyanate, nicotine, and cotinine; (3) examining the utility of the measures in risk reduction, nicotine regulation, and compensation studies; and (4) suggesting future directions. Data indicate that (1) many conclusions regarding what occurs when people switch to low-T/N cigarettes require qualification; (2) machine-based estimates of constituent yield are of little value unless anchored to a direct measure of exposure; (3) research that found no increase in carbon monoxide and/or thiocyanate measures when smokers switched to low-T/N brands does not warrant the conclusion that risk was reduced; (4) nicotine regulation studies must use nicotine/cotinine measures, but need not assess smoking behavior or risk; (5) compensation should refer to factors that account for a particular degree of nicotine regulation; and (6) it may be unreasonable to expect that studies will provide much information regarding the relationship between the critical issues.

86-0876. Moody, P.M.; Haley, J.V. **Quantified Human Smoking Behavior Among Various Disease Categories.** *International Journal of the Addictions* 20(5):751-761, May 1985.

Patients with cancer and respiratory disease patients had longer puff durations and cancer patients tended to have higher tar delivery/cigarette than patients with other diseases, according to a smoking behavior study of 244 patients in seven diagnostic categories. Patients with circulatory problems took longer to smoke a cigarette than patients with other diseases. Endocrine patients had the highest level of nicotine delivery/cigarette and cancer and respiratory patients the lowest. Patients (51 percent men and 49 percent women) ranged in age from 21 to 75 years (82 percent white, 18 percent nonwhite) and were classified as neoplasm (32), endocrine (31), blood problem (23), circulatory (66), respiratory (26), digestive (45), and genitourinary (21). Smoking characteristics for each diagnostic category are tabulated for cigarette puff duration, puff volume, puff interval, number of puffs, smoking time, number of cigarettes/day, tar delivery, and nicotine delivery. More detailed research is needed to determine if the relationships between smoking behavior and smoke deliveries have any cause—effect properties. (Auth. Abs. Mod.)

86-0877. Morgan, S.F.; Gust, S.W.; Pickens, R.W., et al. **Temporal Patterns of Smoking Topography in the Natural Environment.** *International Journal of the Addictions* 20(4):613-621, April 1985.

Temporal variations in smoking topography (including smoking rate, puffs/cigarette, mean puff duration/cigarette, and total puff time/cigarette) were investigated in six smokers in the natural environment. Smoking aspects were measured with a small portable smoking recorder (pressure switch and electronic circuitry for time measurement) mounted inside an aluminum box and connected to a cigarette holder with plastic tubing. When data were averaged in 2-hour blocks across a 10-day period, all but one subject showed differences in smoking topography as a function of time of day. For the entire group, cigarette smoking rates varied significantly across the day ($p<0.05$), but further analysis revealed that this effect was a result of effects found on two subjects ($p<0.001$). Considerable intersubject variability was observed in other aspects of smoking topography that varied over the day. There were also differences in the pattern of changes.

86-0878. National Center for Health Statistics. **Provisional Data From the Health Promotion and Disease Prevention Supplement to the National Health Interview Survey: United States, January-March 1985.** *Advance Data From Vital and Health Statistics*, No. 113. U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, DHHS Pub. No. (PHS)86-1250, November 15, 1985, 16 pp.

Findings from the first 3 months of data collection of the 1985 Health Promotion and Disease Prevention Supplement to the National Health Interview Survey of individual health habits and beliefs, including smoking, are presented. The supplement is designed to monitor progress toward one of the major initiatives of the Department of Health and Human Services. A 1980 report detailed objectives necessary for attainment of goals in each of 15 priority areas. The target date for achieving the objectives is 1990. The supplement will be used for data collection again in 1990 to monitor progress in the intervening 5 years. The 1985 supplement collected baseline data on general health (including nutrition), injury control and child health, high blood pressure, stress, exercise, smoking, alcohol use, dental care, and occupational safety and health. Questionnaire responses are categorized according to age and sex. Data on smoking showed that (1) 33 percent of men and 28 percent of women are current smokers; (2) 36 percent of those aged 30 to 44 years are smokers compared with only 16 percent of those over 65 years of age; (3) 31 percent of men and 23 percent of women consume ≥25 cigarettes/day; (4) 18 percent of women and 32 percent of men are ex-smokers; (5) over 90 percent agree that smoking increases risk of heart disease, emphysema, and lung cancer; (6) 70 to 90 percent agree that smoking increases risk of low birth weight, miscarriage, chronic bronchitis, or esophageal, bladder, or laryngeal cancer; and (7) between 9 and 21 percent agree that cigarette use increases risk of gallstones and cataracts.

86-0879. Quah, S.R. **The Health Belief Model and Preventive Health Behaviour in Singapore.** *Social Science and Medicine* 21(3):351-363, 1985.

Culturally motivated preventive health behavior among women in Singapore, i.e., abstention from smoking and alcohol consumption, highlights the shortcomings in the health belief model (HBM) that were revealed when the model was applied to preventive health behavior in a multiethnic society (Singapore), particularly in variables relating to ethnicity, gender, and religious affiliation. Among Chinese women in Singapore, preventive behavior explains 30.1 percent of the variance in smoking and 19.1 percent of the variance in alcohol consumption. In contrast, none of the HBM factors can explain more than 1 percent of the variance in either of these preventive behaviors. While it is difficult to unravel the components of female preventive behavior, traditional sex role stereotypes may provide some answers. Responses given for not smoking indicate that women still perceive smoking as a "masculine" trait, but women also avoid smoking for health reasons. The same combination of cultural values and awareness of ill effects apply to the female inclination to abstain from drinking alcohol. The HBM is a theoretical framework frequently used in analysis of health-related behavior. Basically, the HBM indicates that for an individual to take action (either to prevent or to cure a given disease), the person (1) perceives the disease as at least moderately severe; (2) perceives personal susceptibility; (3) believes specific benefits result from specific actions, i.e., disease prevention or cure; and (4) perceives no barriers (cost, convenience, pain, embarrassment) impeding the action. Discussion on cultural bias includes (1) HBM components; (2) procedures used to conduct the HBM empirical test; (3) comparisons of preventive health behavior among the three ethnic subpopulations (Chinese, Malay, and Indian); and (4) findings of the HBM test. It is suggested that when the model is used to compare culturally different populations, ethnicity, sex, and religious affiliation be included as salient variables. (Auth. Abs. Mod.)

86–0880. Robins, L.N.; Przybeck, T.R. **Age of Onset of Drug Use as a Factor in Drug and Other Disorders.** U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute on Drug Abuse, NIDA Research Monograph 56, 1985, pp. 178-192.

Drug disorders appear to be most common among 18- to 24-year-olds and high rates are attributed to the rise in drug use in this generation and not to an increase in vulnerability to addiction or abuse among users. Drug use for both men and women is also associated with other adult disorders, such as tobacco use, alcoholism, antisocial personality, depression, and phobia. When early indicators of alcohol problems, heavy tobacco use, antisocial behavior, depression, and anxiety occurred in nonusers, the risk of drug use was increased, particularly if these precursors appeared before the age of 15. In men, drug dependence, but not drug abuse, was clearly related to tobacco use, while in women drug abuse and dependence showed an equal positive relationship to heavy tobacco use. Except for early age at onset, predicting progression from drug use to problem use (at least five times) has not been determined. It is suggested that a useful preventive strategy to postpone first drug use to the age of 18 or later may be effective in reducing drug abuse, even if preventing drug use is not entirely attainable. (Auth. Abs. Mod.)

86–0881. Sanders, J.M., Jr. **Adolescents and Substance Abuse.** *Pediatrics* 76(4):630-632, October 1985.

The problem of adolescent substance abuse (illicit drugs, alcohol, and tobacco) and how it is being addressed by the American Academy of Pediatrics (AAP) is discussed. Data from annual surveys of American high school seniors indicate that use of illicit drugs and cigarette smoking have declined in recent years but alcohol use has remained fairly constant. Smoking declined rapidly between 1977 and 1980, but has since leveled off. Although in excess of two-thirds of high school seniors admitted to having smoked cigarettes at some point, the number who smoked regularly ($\geq$ 10/day) decreased from 28.8 percent in 1977 to 18.7 percent in 1984. There are fewer smokers in every segment of the American population except adolescent girls, among whom smoking rates have increased. Goals, objectives, and projects concerning adolescent substance abuse, recommended to the AAP by a special task force, are reviewed, as are recommendations for coordinating and implementing the proposals.

86–0882. Selwyn, B.J.; Ruiz de Chavez, M. **Coverage and Patterns of Ambulatory Medical Care Use in Tlalpan, Mexico City.** *Social Science and Medicine* 21(1):77-86, 1985.

Smoking represents a health behavior associated with chronic diseases such as heart disease, chronic respiratory disease, and cancer, and information about smoking patterns alerts health care planners to the need for health education about smoking to diminish the impact of chronic disease. In the Mexican community of Tlalpan, a stepped care health system was designed to address problems of duplicated services, inappropriate use of resources, increasing costs of medical care, and unmet health needs in the population. Health centers and hospital-based ambulatory services (outpatient and emergency departments) were surveyed to obtain information about need and utilization patterns. Data showed that among residents 15 years of age and over, 37.3 percent were smokers and 17.7 percent were ex-smokers; 95.2 percent smoked or had smoked $\leq$20 cigarettes/day and 4.8 percent $>$20 cigarettes/day. Median age for initiation of smoking was 18 years. Standardized questionnaires to detect prevalence of certain chronic cardiac and respiratory diseases in residents over 40 years of age (the age when these problems are likely to occur) revealed that respiratory problems were more common than angina pectoris. The most prevalent was dyspnea (grades 3 and 4, 89/1,000 persons), followed by chronic bronchitis (54/1,000 persons).

86–0883. Sieber, M.; Stahli, R.; Angst, J. **Entwicklung des Alkohol-, Tabak- und Medikamentenkonsums bei 19jahrigen Mannern. Ein Querschnittsvergleich 1971-1978-1982. [Development of Alcohol, Tobacco, and Drug Consumption in 19-Year-Old Men. A Cross-Sectional Comparison 1971-1978-1982.]** *Schweizerische Medizinische Wochenschrift* 115(25):865-870, June 1985, German.

Tobacco consumption was compared in populations of 19-year-old men drawn from the Canton of Zurich (Switzerland) during 1971 (6,315), 1978 (3,802), and 1982 (7,341). The percentage of nonsmokers was higher in 1982 than in earlier groups. Mean tobacco consumption declined from 9.4 g tobacco/day in 1971 to 6.4 g tobacco/day in 1982; average cigarette consumption dropped from 15.7 to 15.2 cigarettes/day. Over the same period, alcohol consumption decreased slightly, from an average of 5.3 glasses/week in 1978 to an average of 5.0 glasses/week in 1982. Results are compared with investigations of other Swiss populations.

86–0884. Songkla, Y.N.; Saenghirunvattana, S. **Smoking Among Medical Students.** *Journal of the Medical Association of Thailand* 68(4):198-200, April 1985.

Prevalence of smoking and attitudes about smoking, investigated in 256 third- to sixth-year medical students at the Chulalongkorn Hospital in Bangkok, Thailand, found that only 18 male students (7 percent) were smokers. Average age of smoking onset was 17.4 years, with 11 smokers starting after entering the university. Factors contributing to smoking initiation were stress, family problems, peer pressure, unhappiness, disappointing love affair, and feeling that it is smart to smoke. Although 5 smokers wanted to quit or reduce consumption, the remaining 13 had no intentions of altering their habits. All smokers were aware of the health risks involved and almost all expressed intentions to persuade their patients to reduce daily consumption. The smoking prevalence observed is much lower than in other studies; however, the number of smokers remained fairly constant at each grade level, indicating a lack of successful cessation attempts (only 0.36 percent were ex-smokers).

86–0885. Zeiner, A.R.; Stanitis, T.; Spurgeon, M., et al. **Treatment of Alcoholism and Concomitant Drugs of Abuse.** *Alcohol* 2(3):555-559, May-June 1985.

Alcohol, tobacco, and caffeine use by 291 alcoholics was studied to determine whether (1) drug interactions increase risk for alcohol addiction; (2) synergistic or additive effects increase disease risk; and (3) treatment for alcohol is made more difficult with poorer treatment outcome as a result of concomitant drug use. Controls were 86 social drinkers matched with alcoholics on age, education, gender, race, and socioeconomic status. In a comparison of 80 alcoholics and 80 social drinkers, alcoholics drank more alcohol/day (350.19 cc vs. 28.08 cc, $p<0.001$), smoked more cigarettes/day (27.8 vs. 12.8, $p<0.001$), consumed more caffeine/day ($p<0.002$), were more depressed ($p<0.0001$), had lower internal locus of control scores ($p<0.005$) and higher scores on control by chance ($p<0.03$), and were significantly more anxious ($p<0.0001$). Among 190 alcoholics stratified into quartiles by ethanol consumption, the 47 in the highest quartile smoked an average of 30.0 cigarettes/day. The 47 in the lowest quartile smoked an average of 26.8 cigarettes/day. Some patients used stimulants, tranquilizers, depressants, narcotics, or toluene. Only 3 of 258 abused alcohol without using other drugs. Results confirm the strong associations between alcohol and smoking and between alcohol and caffeine consumption, and may have important implications for alcohol treatment. Alcohol treatment effectiveness may be greatly enhanced by taking into account not only ethanol intake but also depression, anxiety, caffeinism, and smoking. (Auth. Abs. Mod.)

See also, **86–0930, 86–0931, 86–0933**

SMOKING PREVENTION AND INTERVENTION

86–0886. Al-Awadi, A.R. **Summary of Report of WHO Expert Committee on Smoking Control Strategies in Developing Countries, Geneva, 22-27 November 1982.** In: *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 1-6.

The WHO Expert Committee on Smoking Control Strategies in Developing Countries recommended that (1) all tobacco advertising and sales promotion be prohibited; (2) legislation be linked to public information and education programs; (3) nonsmoking areas be established in schools, hospitals, and public transport to protect the rights of nonsmokers; and (4) WHO not engage in dialog with the international tobacco industry until the latter publicly admits that smoking is a major avoidable cause of death and disease. It was also recommended that, to be effective, the ban against smoking be long term, fully publicized, and a major priority in countries where smoking is commonplace and in countries where smoking has not yet become popular. The committee noted that (1) tobacco-related diseases are increasing in developing countries, and smokers have higher annual rates of medical care than nonsmokers; (2) cigarette tar yields in some developing countries (India, China, and the Philippines) are as high as 21 to 23 mg/cigarette compared with 0.5 to 20 mg/cigarette in industrial countries; (3) tobacco cultivation is increasing in developing countries (63 percent of world production compared with 58 percent in 1972 and 50 percent in 1962), while per capita food consumption in many developing countries has remained stagnant or has declined; and (4) tobacco taxes are "politically comfortable" for many governments, i.e., easy to administer and generally acceptable to smokers.

86–0887. Berman, E.J.; Richards, J.W., Jr.; Fischer, P.M., et al. **Tobacco in Hospitals. (Letter).** *Journal of the American Medical Association* 254(24):3420, December 27, 1985.

A survey of hospitals in Georgia (73 percent response) found that of the 90 percent that had established written cigarette and tobacco use policies, 97 percent stated that the policies were enforced, primarily by nursing staff. Of the hospitals that responded, 69 percent were accredited by the Joint Commission on the Accreditation of Hospitals (JCAH). Although 76 percent of hospital administrators were aware of the American Medical Association's recommendations, 16 percent of administrators at JCAH-accredited institutions had no knowledge of the JCAH smoking regulations. In hospitals that permitted sales, two-thirds of the administrators were in favor of eliminating such sales. Of the hospitals surveyed, 90 percent permitted smoking in the cafeteria, but only 6 percent permitted smoking at nursing stations. It is ironic that smoking is still permitted in 89 percent of doctors' lounges, since only 10 percent of physicians still smoke. Further efforts to limit and discourage use of tobacco within health care institutions must be made; cigarette sales should be prohibited and strict limits should be set on tobacco use within hospitals by staff, patients, and visitors.

86-0888. Daube, M. **Public Information Programmes.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 47-58.

Public information work for smoking control entails highly professional publicity and political activity against a background of overt and covert opposition from the tobacco industry. Techniques considered vital for success are (1) careful planning with an eye to objectives, target groups, and evaluation; (2) maintaining persistence; (3) avoiding diversification and dissipation of effort; (4) publicizing single-issue wins and encouraging trends; (5) avoiding competition within the group; (6) avoiding extremism; (7) knowing counterarguments to defense of smoking; (8) exchanging experience and information on successes and failures at international conferences; (9) maintaining a sense of humor; and (10) varying approaches for different target groups. Information/education, legislation, and cessation activities combined in a comprehensive smoking control program can reduce the scale of the problem. Steps that can be taken include (1) banning tobacco advertising and promotion; (2) adequately funding health education; (3) providing stronger and varying health warnings on tobacco products; (4) increasing taxes on tobacco products; (5) supporting the rights of nonsmokers; (6) banning cigarette sales to children; (7) collecting information on smoking patterns and consequences; (8) lowering upper limits for emission products; and (9) assisting smokers who want to quit.

86-0889. D'Hondt, W.; Vandewiele, M. **Some Suggestions Towards Defining a Global Antismoking Strategy in Africa.** *Scientia Paedagogica Experimentalis* 22:315-318, 1985.

At a time when the World Health Organization is raising world conscience to dangers of tobacco smoking, developing countries in Africa (such as Senegal) are experiencing ever increasing pressure from the tobacco industry. Suggestions for antismoking strategies include (1) increasing taxation on tobacco and restricting publicity in the mass media; (2) institutionalizing preventive action beginning at the primary school level, including good examples set by administrative and teaching staff; (3) conceiving antismoking actions on macroeconomic levels; (4) considering practical implications of the theory that heavy smokers are less inclined to accept information on smoking; (5) refraining from exaggerating antismoking information; (6) removing enticements by pressuring parents and adolescent peers into smoking restraint; (7) addressing adolescents both individually and in groups; (8) exposing misleading and insidious advertising; (9) emphasizing the social irresponsibility of damaging the health of others through smoke-polluted air; (10) identifying antismoking objectives clearly; and (11) not setting too high hopes on the success of various therapies.

86-0890. Flay, B.R. **Adolescent Smoking: Onset and Prevention.** *Annals of Behavioral Medicine* 7(2):9-13, 1985.

Findings from 26 school-based studies of psychosocial approaches to smoking prevention suggest that the social influences approach can be effective, at least some of the time. The reports are classed into four generations, i.e., differing in terms of comprehensiveness of program evaluated and methodological quality of the evaluation. Studies of the first three generations suggest that the more general life/social skills approach might also be effective, but fourth generation studies of these approaches are still needed. Important contributions of the first three generations are program development and improvements in methodology of large-scale, school-based research. Program improvements include addition of role-playing, practice and reinforcement of skills, decisionmaking and commitment procedures, and other personal and social skills development. Methodological contributions include tracking of individuals over time, approaches to random assignment of large, aggregated units (e.g., schools) to conditions, informed consent procedures, minimizing and analyzing attrition, and measurement of smoking behavior and related psychosocial constructs. Fourth generation studies were concerned with efficacy of a particular approach to smoking prevention. The next generation of studies needs to explore conditions for efficacy, i.e., for whom they are effective and why they work.

86-0891. Fortmann, S.P.; Sallis, J.F.; Magnus, P.M., et al. **Attitudes and Practices of Physicians Regarding Hypertension and Smoking: The Stanford Five City Project.** *Preventive Medicine* 14(1):70-80, January 1985.

Specific attitudes and practices of 318 physicians in Monterey County, California, regarding cigarette smoking and treatment of hypertension were surveyed as part of the Stanford Five City Project. Of the 62 percent who returned completed questionnaires, 8 percent were smokers, 5 percent were women, and 34 percent were in primary care specialties. Only half of the physicians advised all patients to quit smoking. Physicians who doubted the effectiveness of their antismoking advice or who did not know what to say to patients who smoked were less likely to provide advice. Most physicians felt that patients lacked sufficient motivation to quit. It is concluded that programs to encourage physicians to increase smoking cessation activities should address these attitudes. Older physicians and primary care specialists were less aggressive in treatment of high blood pressure, but none of the assessed attitudes was significantly associated with treatment practices.

86-0892. Heckler, M.M. **Helping Pregnant Women to Stop Smoking. (Letter).** *Public Health Reports* 100(5):(Cover 3), September-October 1985.

Smoking by pregnant women is one of the most important preventable risk factors for low-birth-weight infants, and low birth weight is one of the principal contributors to natal and neonatal mortality. The Department of Health and Human Services has set a national goal of no more than 9 infant deaths/1,000 births by the year 1990. The goal is attainable. About 20 to 25 percent of women who smoke at the beginning of pregnancy quit on their own at some time during the 9 months, and studies suggest that aggressive intervention programs can encourage up to 30 percent more to stop. Phase 1 of the initiative began with a letter to members of the American College of Obstetrics and Gynecology and to 10,000 maternal and child health centers, clinics, and other providers of prenatal care, requesting help and providing materials for distribution in clinics and offices. This was reinforced by public service advertising on radio and television and in public transportation. Phase 2 consists of three programs: (1) Healthy Mothers, Healthy Babies Coalition all-media campaign in key States; (2) EPIC, the Effective Pregnancy and Infant Care Initiative of the Health Resources and Services Administration; and (3) a program calling further public attention to the Surgeon General's warning to pregnant women who smoke. Persuading young women to give up smoking during pregnancy will also reduce incidence of heart disease, chronic lung disease, and cancer.

86-0893. Klesges, R.C.; Vasey, M.M.; Glasgow, R.E. **A Worksite Smoking Modification Competition: Potential for Public Health Impact.** *American Journal of Public Health* 76(2):198-200, February 1986.

Smoking intervention programs based on competition for monetary prizes attracted more smokers and resulted in greater smoking abstention at 6-month followup than traditional smoking control programs. The competition program was offered at four banks and the basic smoking program at a savings and loan institution. Participation was 88 percent for the competition program and 53 percent for the standard program. Pretreatment analyses revealed no differences in program participants in number of cigarettes smoked/day, nicotine content of brand, percent of cigarettes smoked, thiocyanate, and carbon monoxide. However, participants in the competitive program had higher levels of nicotine dependence, suggesting that smokers more resistant to intervention may have been attracted to the program. More participants quit smoking in the competition program (16 percent) than in the standard program (7 percent). It is suggested that competition-based programs may be more effective instruments for worksite health promotion. (Auth. Abs. Mod.)

86-0894. Koop, C.E. **The Pediatrician's Obligation in Smoking Education.** *American Journal of Diseases of Children* 139(10):973, October 1985.

One of the pediatrician's most important educational obligations is to encourage and help parents give up cigarette smoking. The passive smoking-related risks for infants and children are not trivial. The asthmatic child needs to be protected absolutely from exposure to cigarette smoke. Bronchitis, pneumonia, and other lower respiratory tract diseases and hospitalization for these conditions occur more commonly among young children of smokers than among those of nonsmokers. There is persuasive evidence of an association between parental smoking and symptoms such as chronic cough, chronic phlegm production, and persistent wheezing in children. The smoking habit tends to be passed from parent to child: data have shown that at least 75 percent of adolescent smokers come from homes where one or both parents smoke. The critical time for intervention is immediately after the birth of an infant. Encouragement from the physician and the nursing staff can help prevent the mother's return to smoking and, through her example, can encourage the father to quit smoking. Practicing physicians can (1) provide information on risks associated with smoking; (2) show how risks of illness are reduced on cessation; (3) encourage abstinence by advice and direct service; (4) refer patients to smoking cessation programs; and (5) provide their own specific cessation and maintenance strategies. (Auth. Abs. Mod.)

86-0895. Masironi, R. **The Role of WHO in Smoking Control.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 99-102.

Smoking control must be a global undertaking. An efficient vehicle for nations to collaborate on health matters, particularly on the smoking epidemic, is through the World Health Organization (WHO). WHO facilitates communication through technical meetings, collection and dissemination of data, and issuance of health guidelines. WHO has published standardized questionnaires for assessment of smoking habits in adults, young people, and specialized groups such as health professionals. The organization promotes standardization of methodologies and of analytical procedures for determination of tar, nicotine, and carbon monoxide in cigarettes, particularly those available for sale in developing countries. WHO also collaborates with other United Nations agencies and nongovernmental bodies, according to specific expertise. A 1976 WHO survey of smoking control legislation revealed that only 20 countries had legislation in this field. The latest WHO survey, published last year, revealed that 60 countries now have smoking control legislation, clearly demonstrating how the momentum of successful legislation in some countries can induce other countries to follow. The tobacco industry is a transnational enterprise. The health enterprise must also be transnational. (Auth. Abs. Mod.)

86–0896. National Heart, Lung, and Blood Institute. **National Cholesterol Education Program and NHLBI Smoking Education Program. Summary Report.** U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Heart, Lung, and Blood Institute, Planning Workshop for Worksite Programs, Bethesda, Maryland, May 7-8, 1985, May 1985, 108 pp.

A successful worksite health promotion and disease prevention program, incorporating education on smoking and blood cholesterol, requires (1) modifying the existing business environment and cultural norms to promote and reinforce healthy lifestyles; (2) documenting effective worksite programs and making them accessible to businesses; and (3) being responsive to business needs and concerns in promoting worksite health programs. Smoking education requires (1) developing environmental and cultural norms within businesses that include both explicit and implicit antismoking messages, and clear policies on smoking in the workplace; (2) targeting heavy smokers, particularly among blue-collar workers, low-income groups, and low-education groups; and (3) preventing smoking among young people in businesses employing large numbers of young workers. Cholesterol education requires identifying potential target populations within the workplace through effective screening, and utilizing a basic program approach that includes members of the employee's family and provides special attention to employees at risk of developing cardiovascular disease. Information, attitude, and behavior objectives applied to both workers and to companies are discussed. Tactics for urging companies to develop promotional and disease prevention programs, particularly where none exist, are suggested.

86–0897. National Heart, Lung, and Blood Institute. **NHLBI Smoking Education Program. Summary Report.** U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Heart, Lung, and Blood Institute, Planning Workshop for Professional and Patient Education, Bethesda, Maryland, January 29-30, 1985, January 1985, 96 pp.

Clinical opportunities, defined as clinical situations when patient receptivity to antismoking intervention is likely to be heightened, are identified and methods for implementing intervention are discussed. Pregnancy and the postpregnancy period are important clinical opportunities for urging women to initiate smoking cessation or to maintain nonsmoking behavior for their own and infant health. Also at high risk are very young children (5 to 7 years of age) of parents who smoke, the preadolescent under peer influence, and the adolescent attracted to "grownup" behavior. Health care providers are in a special position to act as role models and catalysts for creating healthful, smoke-free environments. High-risk patients, particularly those with smoking-related diseases, may be more motivated toward cessation of smoking. Regular periodic visits to a physician are also opportunities for suggesting alternatives to smoking or prescribing nonsmoking behavior. Specific resources needed to assist health professionals to intervene more effectively with patients who smoke are (1) a short, simple, specific intervention protocol; (2) an enhanced process for taking smoking histories; (3) knowledge of effective intervention methods; and (4) information on smoking cessation programs and clinics that can be used for patient referral.

86–0898. Rhoades, E.R.; Fairbanks, L.L. **Smoke-Free Facilities in the Indian Health Service. (Letter).** *New England Journal of Medicine* 313(24):1548, December 12, 1985.

Efforts of the Indian Health Service (IHS) to develop and implement a smoke-free policy within their facilities are described in response to a letter (*New England Journal of Medicine* 312(18):1197-1198, May 2, 1985) and subsequent correspondence (*New England Journal of Medicine* 312(26):1710-1713, June 27, 1985) that cited the positive effects of banning smoking within hospitals and public health institutions. The Public Health Service (PHS) Indian Hospital on the Hopi Reservation in Keams Canyon, Arizona, achieved a 100 percent smoke-free environment in late 1983. Since then, more than 130 IHS facilities in 19 States have become smoke free and recommendations for smoke-free clinical areas have been expanded to include administrative offices. Previous points made about the numerous economic, social, labor, and legal barriers to establishment of smoke-free environments must be recognized if success is to be achieved. Voluntary participation by all employees, which was achieved by the IHS, is considered an underrated technique for establishing smoke-free policies. The leadership of C. Everett Koop, M.D., Surgeon General of the U.S. PHS, was instrumental in the implementation of the policies. See also 85-1577, 85-1903.

86–0899. Sanders, D. **Weeding Out the Weed.** *Nursing Mirror* 161(12):20-22, September 1985.

The Health Check, a new form of consultation, is being offered by practicing nurses in the United Kingdom for identifying risk factors related to smoking and intervening to prevent unnecessary disease. A systematic strategy for giving advice to smokers is based on four stages: (1) determining the smoker's beliefs about health and smoking; (2) providing information; (3) planning a withdrawal strategy; and (4) following up and supporting the potential ex-smoker. It is suggested that smoking advice be made personally relevant. Health education literature must also be personalized, i.e., medical and family history, friends' smoking-related diseases, present health problems, or use of the "pill." Benefits of quitting should be stressed, including immediate risk reduction of heart disease, cancers, stroke, respiratory problems, and chronic bronchitis; fewer colds, coughs, and chest infections; and financial rewards. Specific objectives and goals must be negotiated with the smoker. Withdrawal effects, fears of weight gain, or stresses formerly handled through smoking should be discussed, and methods for coping should be planned. Support, considered vital to success, should consist of regular followup appointments with the nurse and contact with sympathetic friends, family, or a smokers' group.

86–0900. Strasburger, V.C. **Sex, Drugs, Rock 'N' Roll: Are Solutions Possible? A Commentary.** *Pediatrics* 76(4):704-712, October 1985.

Among successful antismoking programs aimed at adolescents are social-psychologic programs consisting of (1) assertiveness training to resist peer pressures toward adopting unhealthy behaviors; (2) organized physical risk-taking projects (e.g., sports, Outward Bound); (3) stress management activities to create natural "highs" (e.g., yoga or transcendental meditation); and (4) projects designed to increase self-esteem and self-concept. An entirely different concept, promoted by the San Francisco-based A Smokeless Generation, relies heavily on an intensive media campaign, T-shirts, celebrities, and rock concerts to foster the notion that being a nonsmoker is far preferable to smoking. The campaign originated in Sweden, where smoking has declined among adolescents since 1977 by 16 percent in males and 15 percent in females. It provides alternative goals, giving adolescents a chance to make choices and decisions. Adolescent sexual experimentation is also a major problem, and prevention of such activity intersects with prevention of drug abuse in several key areas: the family, the media, the role of the physician, the appropriateness of prevention, and the need to understand what is normal adolescent behavior. Only when the dual problems are thoroughly understood and their etiologies in adult society are acknowledged will attempts at solutions be successful. (Auth. Abs. Mod.)

See also, **86–0864, 86–0929**

SMOKING CESSATION METHODS

86–0901. Clavel, F.; Benhamou, S.; Company-Huertas, A., et al. **Helping People to Stop Smoking: Randomized Comparison of Groups Being Treated With Acupuncture and Nicotine Gum With Control Group.** *British Medical Journal* 291(6508):1538-1539, November 30, 1985.

Groups that were treated with acupuncture and nicotine gum had a higher rate of smoking cessation in the first month after treatment than a control group, but the tendency to relapse was not reduced. Efficacy of treatment was studied in 651 volunteer participants (out of 35,000 smokers contacted) over a 12-month period. Of 224 treated with acupuncture, 43 had quit smoking after 1 month ($p=0.001$) and 17 were ex-smokers at 13 months ($p=0.02$). Of 205 treated with nicotine gum, 46 had quit smoking after 1 month ($p=0.00001$) and 24 were ex-smokers at 13 months ($p=0.001$). Among 222 controls, 18 quit smoking after 1 month and 6 were ex-smokers at 13 months. Adults smoking at least 5 cigarettes/day were eligible for participation. No significant difference was found between the three groups for sex, age, age at first cigarette, daily consumption, previous attempts to stop smoking, and frequency of inhalation. Treatment (acupuncture, nicotine gum, or control) was allocated by balanced randomization, and each group received three 1-hour sessions of group therapy during the first month. In the acupuncture group, needles were placed bilaterally for 30 minutes at the "shuai gu" and "qiuhou" points. For those using nicotine gum, 105 pieces of 2 mg nicotine gum were provided. Control group members were given a cigarette case with a lock controlled by a time switch that could be regulated at will.

86–0902. Coppotelli, H.C.; Orleans, C.T. **Partner Support and Other Determinants of Smoking Cessation Maintenance Among Women.** *Journal of Consulting and Clinical Psychology* 53(4):455-460, August 1985.

Naturally occurring partner support (partner facilitation factor) emerged as the primary predictor of smoking cessation maintenance in a prospective study of 125 newly abstinent married smokers. Six days after quitting, women supplied demographic and smoking habit data along with self and partner ratings of attributes and behaviors. The partner facilitation factor, accounting for 74 percent of the common variance, encompassed both quitting-related and general interactions, and loaded on the following behaviors: problem-solving, rewarding quitting, understanding, listening, and facilitating the enactment of coping and nonsmoking skills. When entered into a stepwise discriminant analysis with 19 other variables, the factor emerged as the primary predictor of smoking cessation maintenance, accounting for 32 percent of variance in outcome at 6 to 8 weeks and accurately identifying more than 80 percent of both successful and unsuccessful quitters. Abstainers significantly more often than nonabstainers had partners who were ex-smokers (29.8 percent vs. 9.5 percent) or partners who were smokers and who successfully quit with them (23.0 percent vs. 7.8 percent). Partners who were never smokers slightly hindered success (19.7 percent for abstainers, 31.3 percent for nonabstainers). (Auth. Abs. Mod.)

86–0903. Fuerste, W.C. **Method and Device for Discouraging Cigarette Smoking.** United States Patent No. 4,557,279, December 10, 1985, 4 pp.

A cigarette-holding device that discourages smoking by delivering a health risk message is described. The holder is equipped with treated filter paper that carries health risk messages that are invisible at start of smoking, but become clearly readable during smoking (words such as "cancer," or "emphysema"). The method calls for placing a cigarette into the holder, lighting the cigarette, withdrawing smoke from the lighted cigarette so that the smoke draws through the holder and the previously inserted filter paper. As the invisible letters attract smoke particles, the message will appear, graphically alerting the smoker to the dangers of smoking. (Auth. Abs. Mod.)

86–0904. Knudsen, N.; Schulman, S.; Van den Hoak, J., et al. **Insights on How to Quit Smoking: A Survey of Patients With Lung Cancer.** *Cancer Nursing* 8(3):145-150, June 1985.

A survey of 57 lung cancer patients provided information on motivations and methods for stopping smoking, benefits of quitting, withdrawal symptoms, advice for people wishing to quit, opinions about the causes of lung cancer, and resumption of smoking. Of 51 patients who quit smoking, 34 did so either at the time of cancer diagnosis or immediately after surgery; 15 identified lung cancer or a cancer-related reason for the decision to quit, while 17 quit prior to cancer diagnosis because of general or specific respiratory health reasons. Family and friends were identified most frequently as sources of support. Two-thirds of patients claimed no withdrawal symptoms after quitting, while 30 experienced benefits (i.e., improved quality of life compared with health status while smoking). Patient suggestions for helping others to quit smoking are discussed (e.g. avoiding other smokers, breaking lifestyle pattern, suggesting possibility of lung cancer, and others). On the causes of lung cancer, the most frequently identified risk factor was smoking (31 percent of current smokers and 59 percent of former smokers); however, there appears that some denial of the facts is present in the inability to acknowledge the link between smoking and lung cancer. Answers to questions about resumption of smoking showed that the issue of smoking is clearly a difficult one for patients to resolve. Of 16 smokers at the time of the survey, 6 had never tried to quit and 10 had tried but had been unsuccessful. Recommendations to nursing personnel on how to facilitate cessation of smoking among lung cancer patients are provided.

86–0905. Levitt, E.E. **Smoking Withdrawal. An Evaluation of Its Role in the Total Effort to Stop Smoking.** *Indiana Medicine* 78(7):581-584, July 1985.

Smoking withdrawal clinics and similar efforts to assist the habituated smoker are not cost effective because (1) even the modest 25 to 30 percent remission rate of the average withdrawal effort is probably inflated by misleading self-reports; (2) reported abstinence over a given time period may not be continuous; (3) U.S. Department of Agriculture data do not support the contention that 30 million Americans have given up smoking; and (4) regardless of the number of quitters, the Surgeon General has estimated that 95 percent have quit on their own, without formal assistance. It is suggested that it would be more cost effective to place greater emphasis on preventive efforts through the media to reach large numbers of smokers with a minimum of cost. Smoking withdrawal clinics should be abandoned.

86–0906. Sirota, A.D.; Curran, J.P.; Habif, V. **Smoking Cessation in Chronically Ill Medical Patients.** *Journal of Clinical Psychology* 41(4):575-579, July 1985.

Followup data at 1 year for eight male smokers with chronic pulmonary and/or cardiac disease who participated in a treatment program (gradual nicotine withdrawal, self-management techniques, and relapse prevention strategies), showed that 50 percent remained free from smoking while those who relapsed smoked substantially less than before treatment. Patients (mean age 52.9 years) were long-term cigarette smokers (mean 35.6 years, mean 36.3 cigarettes/day) with a history of numerous unsuccessful attempts to quit smoking. The nine weekly group sessions, led by two clinical psychologists, concentrated on (1) nicotine-fading or gradual nicotine withdrawal by switching to brands with lower nicotine content; (2) self-management or stimulus control strategies such as recognizing and modifying discriminative stimuli and reinforcers; and (3) relapse prevention, consisting primarily of cognitive-behavioral strategies for improving maintenance through anticipation of and coping with situations leading to relapse. Followup sessions were held at weeks 14, 23, 40, and 62. Nonspecific factors of group influence and support and weekly feedback of breath carbon monoxide levels were particularly important treatment components. (Auth. Abs. Mod.)

86–0907. Stumpfe, K.-D. **Entzugsbeschwerden bei Nikotinsucht. Schlusswort. (Letter). [Withdrawal Symptoms in Nicotine Addiction. Epilogue.]** *Munchener Medizinische Wochenschrift* 126(46):20, November 16, 1984, German.

In response to criticisms (*Munchener Medizinische Wochenschrift* 126(46):19-20, November 16, 1984) of data from a 5-day group therapy smoking cessation program (*Munchener Medizinische Wochenschrift* 126(23):731-735, June 8, 1984), it is emphasized that the subjects undergoing smoking withdrawal therapy had a desire to quit smoking and that withdrawal treatment with a comparative group (i.e., subjects who do not wish to quit smoking) is irrelevant. The majority of subjects participating were addicted to nicotine, although this is not true for all people who smoke. Furthermore, the number of cigarettes smoked is not related to addiction because there is no such thing as a "degree of addiction." It is agreed that the number of successful abstainers should have been quantified; however, 94 percent of participants present at the fifth session claimed abstinence. Experience in a large group was the significant factor in the study; therefore, analysis of personal properties and behavior was not reported. See also 85-0260, 85-1544.

86–0908. Vandevenne, A.; Rempp, M.; Burghard, G., et al. **Etude de l'Action Specifique de l'Acupuncture dans la Cure de Sevrage Tabagique. [Study of the Specific Contribution of Acupuncture to Tobacco Detoxication.]** *Semaine des Hopitaux* 61(29):2155-2160, September 1985, French.

More than 43 percent of people under 36 years of age who were treated with acupuncture stopped smoking compared with 21.7 percent in the placebo group ($p<0.001$) in a tobacco detoxication study of 200 persons divided into two age groups. The specific contribution of acupuncture to tobacco detoxication was analyzed in outpatients using a simple blind design with conventional (108 persons) and placebo (92 persons) acupuncture points. In contrast with results in the two age groups (over and under the age of 36 years), in the group as a whole there were no significant differences between the two treatment protocols at 6 weeks, 6 months, and 1 year. Problems met in interpreting results of acupuncture treatments are discussed. (Auth. Abs. Mod.)

86–0909. West, R.J.; Russell, M.A.H. **Pre-Abstinence Smoke Intake and Smoking Motivation as Predictors of Severity of Cigarette Withdrawal Symptoms.** *Psychopharmacology* 87(3):334-336, November 1985.

Data indicate that preabstinence measures of smoking motivation and smoke intake may provide a guide to severity of withdrawal symptoms, and that smokers with high preabstinence nicotine intake experience the greatest discomfort. In 29 cigarette smokers who completed a smoking motivation questionnaire, expired air carbon monoxide (CO) and plasma nicotine concentrations were measured prior to abstaining from smoking for 24 hours. Before and after abstinence, mood and physical symptoms known to be affected by cigarette abstinence (e.g., irritability, restlessness) were rated. Scores on the "dependent smoking" subscale of the smoking motivation questionnaire correlated significantly with overall withdrawal severity, craving, and increased irritability. "Indulgent smoking" scores correlated positively with increased hunger. Preabstinence plasma nicotine concentration significantly predicted craving, hunger, restlessness, inability to concentrate, and overall withdrawal severity, while CO in expired air predicted craving and restlessness only. Usual daily cigarette consumption did not significantly predict any withdrawal effects. (Auth. Abs. Mod.)

PASSIVE SMOKING

86–0910. Esmen, N.A. **The Status of Indoor Air Pollution.** *Environmental Health Perspectives* 62:259-265, October 1985.

Smoking is one of the most significant sources of indoor air contamination and is also the most thoroughly studied. Approximately 90 percent of tobacco smoke is in the form of gases; the remaining 10 percent contains up to 2,000 different compounds. The chemical composition of smoke is altered by burning temperature, type and blend of tobacco, substitutes and additives, and use of filters. Differences in contaminant generation rates are primarily related to air flow and temperature differences during and between puffs. Puffing produces higher burning temperatures at the cone and consequently greater pyrolysis, but the hot airstream generated by puffing sweeps more gases and volatiles from the tobacco to the mainstream. Therefore, it is not surprising that mainstream generation rates of most volatile compounds exceed sidestream rates. Inhalation of mainstream smoke will result in selective reduction of constituent concentrations. Owing to absorption and deposition, less than one-seventh of the original weight of volatiles and particulates is exhaled. Consequently, sidestream smoke must be considered the most important contributor to involuntary smoking. Local mixing factors are important in passive exposure to smoke, and although a nonsmoker may seek to minimize exposure, under certain circumstances a nonsmoker may be at a highly disadvantageous location and be exposed to levels well beyond those suggested by a general estimate. It is not known to what degree particles from cigarette smoke participate in chemical reactions while suspended in the air. Indoor air pollution presents a new and important challenge to researchers. Information is lacking in several important areas, including exposures to contaminants generated by use of consumer products and by hobbies and crafts.

86–0911. Ferris, B.G., Jr.; Ware, J.H.; Berkey, C.S., et al. **Effects of Passive Smoking on Health of Children.** *Environmental Health Perspectives* 62:289-295, October 1985.

Data on passive smoking among 13,545 preadolescent children from the Harvard Six-Cities study (aged 6 to 11 years) demonstrated an exposure—response relationship between the amount of smoke exposure in the household and reporting rates for doctor-diagnosed respiratory illness before age 2, history of bronchitis, wheeze most days and nights apart from colds, and a composite of symptoms defined as the lower respiratory index. When only the amount currently smoked by the mother was analyzed, a relatively uniform increase in each of the reported diseases and symptoms was found. Forced expiratory volume in 1 sec (FEV_1), adjusted for height, weight, and age, was lower in children with mothers who smoked than in children of nonsmokers. Furthermore, the rate of increase in FEV_1, after adjusting for normal growth, was significantly lower in children of smokers and followed a dose—response trend. Children of smokers were also shorter on average than children of nonsmokers, but no ongoing passive smoking effect could be ascertained. Overall, differences observed were small and their medical significance remains to be defined. (Auth. Abs. Mod.)

86–0912. Green, C.; Ingebrethsen, B.; Heavner, D. **Measurement of Nicotine in Building Air as an Indicator of Tobacco**

Smoke Levels. (Letter). *Environmental Health Perspectives* 63:249, November 1985.

Analysis of nicotine concentrations in building air (*Environmental Health Perspectives* 60:405-410, May 1985) indicates that the office area measured either had exceedingly clean air or the reported novel nicotine collection method was very inefficient. Even if the calculations from the pump collection were correct and the concentration of nicotine in the "smoky" office was 1.96 $\mu g/m^3$, the calculated nicotine exposure (based on a mainstream value of 1.0 mg nicotine/cigarette and respiration volume of 1.0 m^3/hour) is equivalent to 0.0156 cigarette/8-hour day. This exposure is much less than the 1.1 passive smoking exposure value cited in the paper. Concentration of nicotine quoted in the pump collection experiment also appears to be in error. The value of 1.96 $\mu g/m^3$ appears to have been calculated incorrectly by dividing the nicotine collection rate by the rate the air was pumped over the plate. With the given values, it can be shown that the highest concentration of nicotine determined in the room was 1.22×10^{-2} $\mu g/m^3$. This converts to an 8-hour exposure of 0.0000976 cigarette equivalents. Nicotine levels in a typical office area range from 10 to 30 $\mu g/m^3$, according to other studies. See also 86-0328.

86–0913. Hirayama, T. **Passive Smoking and Lung Cancer, Nasal Sinus Cancer, Brain Tumor and Ischemic Heart Disease.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 137-141.

Spouses of heavy smokers are at risk of developing lung cancer, nasal sinus cancer, brain tumor, and ischemic heart disease, according to a 16-year followup study of 265,118 Japanese adults aged 40 years and older. Passive smoking risks increased with increased consumption by the spouse. Of 429 lung cancer deaths among women, 303 had been nonsmokers and 200 of these had been spouses of smokers. A significant risk of paranasal sinus cancer and brain tumor was observed in nonsmokers married to smokers, strengthening plausibility of carcinogenic hazards of inhaling sidestream smoke. The extent of a spouse's smoking was also related to a significant elevated risk of ischemic heart disease in nonsmokers.

86–0914. Jarvis, M.J.; Russell, M.A.H. **Passive Exposure to Tobacco Smoke. (Letter).** *British Medical Journal* 291(6509):1646, December 7, 1985.

Objections raised about the risk of passive smoking in children (*British Medical Journal* 291(6509):1646, December 7, 1985) are answered, and it is agreed that not all of the passive smoking dose in the children studied can be attributed to parents and siblings, since even children of parents who do not smoke receive a dose equivalent to 11 cigarettes/year. However, the suggestion that levels of cotinine are one to four times higher in saliva than in blood is not acceptable. In a sample of 194 smokers and nonsmokers, the correlation between cotinine in saliva and plasma was found to be 0.96. The important question is whether passive smoking represents a real threat to health. Even after controlling for parental illness and other factors, a recent study still found significant effects of passive smoking on children's respiratory health. Both maternal and paternal smoking were associated with respiratory illness in children, but the association was strongest when the mother smoked. Similar results have been reported by others. There is now a situation where reported patterns of symptoms correspond with quantitative measures of dose received. See also 86-0915, 86-0918.

86–0915. Jarvis, M.J.; Russell, M.A.H.; Feyerabend, C., et al. **Passive Exposure to Tobacco Smoke: Saliva Cotinine Concentrations in a Representative Population Sample of Non-Smoking Schoolchildren.** *British Medical Journal* 291(6500):927-929, October 5, 1985.

The relationship between salivary cotinine concentrations and exposure to tobacco smoke within the family was examined in a representative sample of 569 nonsmoking secondary schoolchildren. When neither parent smoked (269 children), mean salivary cotinine concentration was 0.44 ng/mL. Mean levels were 1.31 ng/mL when only the father smoked ($n=96$), 1.95 ng/mL when only the mother smoked ($n=76$), and 3.38 ng/mL when both parents were smokers ($n=128$). Although the effect of parental smoking on cotinine concentrations was highly significant ($p<0.001$), smoking by the mother had a stronger influence than smoking by the father ($p<0.01$). A small independent effect of number of siblings who smoked was also observed ($p<0.01$). The dose of nicotine was estimated to be equivalent to the active smoking of 30 cigarettes/year for a father who smoked, 50 cigarettes/year for a mother who smoked, and 80 cigarettes/year if both parents were smokers. Passive smoke exposure may continue throughout childhood and is considered to pose a definite health risk. (Auth. Abs. Mod.)

86–0916. Kabat, G.C.; Dieck, G.S.; Wynder, E.L. **Bladder Cancer in Nonsmokers.** *Cancer* 57(2):362-367, January 1986.

Passive smoking (spouse's smoking or exposure to sidestream smoke), coffee drinking, and artificial sweetener use were not related to bladder cancer risk among 76 male and 76 female bladder cancer patients who were lifetime nonsmokers. Patients were compared with 238 male and 254 female controls to assess risk factors in the absence of the smoking variable. Risk factors included usual occupation, smoking by the spouse, sidestream smoke exposure (at home, at work, and in transportation), coffee drinking (caffeinated and decaffeinated), artificial sweetener use, body mass index, and history of diabetes and high blood pressure. There was some indication that several occupations were overrepresented among cases, i.e., chemical workers (primarily chemists and chemical engineers), firemen, machinists, and physicians. A positive association was found with snuff use in a small number of women (three cases and one control). With respect to spouses who smoked, 15 of 49 male cases (30.6 percent) compared with 50 of 137 male controls (36.5 percent) and 24 of 35 female cases (68.6 percent) compared with 83 of 129 controls (64.8 percent) were exposed to passive smoking at home. (Auth. Abs. Mod.)

86–0917. Karakostov, P. **Pasivno Pushene Sred Bremennite Zheni i Otrazhenieto mu V"rkhu Tegloto i R"sta na Novorodenoto Dete. [Passive Smoking Among Pregnant Women and Its Effect on the Weight and Height of the Newborn.]** *Akusherstvo i Ginekologiia* 24(2):28-31, 1985, Bulgarian.

Among the 214 pregnant women studied, 53 (32.6 percent) of 163 nonsmokers were passive smokers during pregnancy and 26 (51.0 percent) of 51 women who smoked before, but not during pregnancy, were also classified as passive smokers. The mean birth weight of infants born to passive smokers (3,297.06±58.98 gm) was significantly less than that of 43 infants born to nonsmokers (3,381.16±80.09 gm, $p<0.05$). Infants born to passive smokers were also significantly shorter than those born to nonsmokers (50.04±0.26 vs. 50.51±0.34 cm, $p<0.05$). It is concluded that the observed passive smoking prevalence represents real conditions that demonstrate the negative effects of toxic tobacco smoke components on pregnant women and intrauterine fetal development. (Auth. Abs. Mod.)

86–0918. Lee, P.N. **Passive Exposure to Tobacco Smoke. (Letter).** *British Medical Journal* 291(6509):1646, December 1985.

The estimated nicotine intake by children of parents who smoke, reported as equivalent to 80 cigarettes/year (*British Medical Journal* 291(6500):927-929, October 5, 1985), is open to argument because (1) all salivary cotinine in children is assumed to be from parents who smoke and is inconsistent with the nonzero value of 0.44 ng/mL seen in children with parents who do not smoke; (2) use of arithmetic means may not be justified with such grossly skewed data; (3) assumption that salivary cotinine is in equilibrium with blood cotinine with an equivalence of 1 may not be valid; (4) cigarette equivalents cannot necessarily be inferred from relative cotinine levels; and (5) extrapolation from adult smoker to children nonsmoker levels is dubious. However, even if one ignores all these points and accepts what seems a rather high figure of 80 cigarettes/year, the conclusion that this poses a definite health risk seems totally unjustified. No epidemiological study has indicated excess risk in smokers of 0 to 2 cigarettes/day, and increased prevalence of cough in children of smokers is poor evidence of direct passive smoke effects. The increase in cough may also result from cross infection by parents or other confounding variables (e.g., social class, type of cooking, parental neglect, and nutrition). Overall, while the study is interesting and valuable, the unwarranted extrapolations from its results diminish its scientific status. See 86-0915.

86–0919. Luck, W.; Nau, H. **Nicotine and Cotinine Concentrations in Serum and Urine of Infants Exposed Via Passive Smoking or Milk From Smoking Mothers.** *Journal of Pediatrics* 107(5):816-820, November 1985.

Exposure of infants to nicotine via milk or inhaled sidestream smoke was evaluated in 19 neonates nursed by smokers, 10 nursed by nonsmokers, 10 exposed to parental smoking but not breast-fed, and 9 nursed by mothers who smoked and were exposed to smoke. Neonates nursed by smokers and unexposed to passive smoke showed measurable serum concentrations of nicotine (0.2 to 1.6 ng/mL) and cotinine (5 to 30 ng/mL) and also excreted nicotine and cotinine in urine (5.0 to 110 and 10 to 555 ng/mg creatinine, respectively). Only one infant nursed by a nonsmoker excreted measurable amounts of nicotine and cotinine. Older infants who were not breast-fed but were exposed to passive smoke had nicotine/creatinine (N/C) and cotinine/creatinine (C/C) ratios of from 4.7 to 218 and 117 to 780, respectively. Infants exposed to passive smoke and to smoke via breast milk had N/C and C/C ratios of from 3.0 to 42 and 225 to 870, respectively. The significant serum concentrations and urinary excretion rates of nicotine in breast-fed infants of smokers suggest that breast feeding contributes to nicotine exposure. The wide variation of cotinine excretion values in older infants did not allow separate evaluation of the two exposure routes. (Auth. Abs. Mod.)

86–0920. Martin, M.J. **Regulation of Smoking in the Workplace: The San Francisco Experience.** University of California, School of Medicine, Institute for Health Policy Studies and Department of Epidemiology and International Health, San Francisco, Discussion Paper Series, 1983, 11 pp.

San Francisco's 1983 ordinance regulating smoking in the workplace, reviewed 1 year later, is characterized by ease of implementation and maintenance, in marked contrast to preenactment predictions of opponents who funded a 1,200 million dollar campaign that nearly overturned the ordinance. The ordinance, one of the first of its kind, requires that smoking be prohibited in a workplace if an acceptable compromise between smokers and nonsmokers cannot be reached. Over the first 12 months, 124 complaints were registered and one citation was issued, but no legal actions were taken either by the city or against the city. The program did not require the hiring of any new employees. One Department of Public Health inspector, needing no special training, was assigned to the program. The time spent by the inspector at the beginning of the year was divided between office work (21 percent) and field work (25 percent). During the last 4 months, only 21 percent of his time was required. No additional funds were requested or needed to enforce the legislation. (Auth. Abs. Mod.)

86–0921. McMurray, R.G.; Hicks, L.L.; Thompson, D.L. **The Effects of Passive Inhalation of Cigarette Smoke on Exercise Performance.** *European Journal of Applied Physiology* 54(2):196-200, 1985.

Passive inhalation of cigarette smoke had a significant detrimental effect on exercise performance (reduced maximal aerobic power and endurance capacity and increased need for anaerobiosis) in eight women in an aerobic exercise class. Four smokers (>1 pack/week) and four nonsmokers ran on a motor-driven treadmill for 20 minutes at 70 percent of maximal oxygen uptake, followed by an incremental change in grade until maximal work capacity was obtained. Each subject completed the exercise trial with and without the presence of residual cigarette smoke. Passive smoke inhalation significantly reduced maximal oxygen uptake (0.25 L/min) and time to exhaustion and also elevated maximal R value (1.01 vs. 0.93), maximal blood lactate (6.8 vs. 5.5 mmol), and ratings of perceived exertion (17.4 vs. 16.5 units). Passive inhalation of smoke during submaximal exercise significantly elevated the CO_2 output (1.68 vs. 1.58 L/min), R values (0.91 vs. 0.86), heart rate (178 vs. 172 beats/min), and rating of perceived exertion (1.38 vs. 11.8 units). (Auth. Abs. Mod.)

86–0922. Pattishall, E.N.; Strope, G.L.; Etzel, R.A., et al. **Serum Cotinine as a Measure of Tobacco Smoke Exposure in Children.** *American Journal of Diseases of Children* 139(11):1101-1104, November 1985.

Cotinine (a major metabolite of nicotine) concentration in serum is a useful indicator of actual tobacco smoke exposure in young children. However, studies also indicate that there are unexplained racially based cotinine level differences. Concentrations of serum cotinine in 38 young children were compared with smoking histories of home residents. Cotinine was detected in 26 children (range 0.4 to 14.9 ng/mL), 10 of whom had no household exposure. Serum cotinine concentration was significantly elevated in blacks (4.4±4.32 ng/mL) compared with whites (0.5±0.9 ng/mL, $p<0.0001$) after controlling for the number of smokers at home. After stratifying by race, a significant direct correlation was found between serum cotinine concentration and the number of smokers at home, the amount smoked by the mother, and the amount smoked by others in the home. Adjusted mean difference after controlling for race indicated an increase of 0.7 ng/mL if there was one smoker at home; however, this increased to 10.2 ng/mL if there were four smokers at home. Serum cotinine was detected more frequently and was significantly greater if the mother smoked. A significant correlation with amount smoked by the mother was also observed ($p<0.0001$). (Auth. Abs. Mod.)

See also, **86–0894**

86–0923. Weiss, S.T. **Passive Smoking and Lung Cancer. What is the Risk?** *American Review of Respiratory Disease* 133(1):1-3, January 1986.

Scientific studies examining the association between passive smoking and lung cancer are reviewed to define measurement problems encountered in assessing passive smoke exposure, particularly biological and mathematical assumptions. Methodological issues (e.g., misclassification of exposure status and accurate measurement of exposure) and how they tend to bias the risk ratio or odds ratio toward unity or no effect are discussed. It is concluded that despite simplifying assumptions of risk estimates and flaws in epidemiologic data, the mortality figures cited (i.e., 4,700 Americans die each year from lung cancer as a result of passive smoke exposure) remain the best current estimates of lung cancer deaths from secondhand smoke exposure. Future epidemiologic studies may revise the estimates, but it is considered unlikely that they will dispute the basic nature of the association.

86–0924. Whidden, P. **Effects of Passive Smoking. (Letter).** *Lancet* 1(8473):150, January 1986.

Because there is now compelling evidence that passive smoking can cause premature death, it is no longer acceptable to use mortality rates of passively exposed nonsmokers as a baseline (*Lancet* 2(8469/8470:1430, December 21-28, 1985). Data cited do not differentiate between passively exposed nonsmokers and true nonsmokers or between adult smokers passively exposed before taking up active smoking and adult smokers not so exposed. Several studies have found a significant increase in lung cancer mortality in groups chronically exposed (usually spouses of smokers). Since environmental tobacco smoke is diluted by air far more than mainstream smoke, there is reason to doubt the assertion that chemicals in tobacco smoke can be considered lethal only if mortality is "always . . . related to quantity smoked." Passive smoking in both childhood and adulthood carries a greater risk of cancer than does exposure during only one of these periods, and the greater the number of smokers in a household, the greater the risk for nonsmokers.

SMOKELESS TOBACCO

86-0925. Bailey, B.J. **We Must Stop Selling Cancer to Our Children.** *Archives of Otolaryngology* 111(10):637-638, October 1985.

Some thoughts, concerns, and recommendations concerning the growing problem of smokeless tobacco use among children are presented. Despite the surrounding controversy, it is generally recognized that (1) there is a time—dose relationship between tobacco use and the entire spectrum of oral tissue changes; (2) there is a factor of habituation with tobacco usage that increases with time; (3) there is increased oral cavity cancer in women and younger adults as a consequence of tobacco consumption; and (4) most smokeless tobacco users begin at a young age. Other issues involving existing realities that must be challenged and changed include (1) advertising, which equates smokeless tobacco use with success, fun, popularity, and patriotism; (2) endorsement by celebrated adult athletes who are idolized by aspiring child athletes; (3) absence of advertising restrictions and warning labels; (4) misleading statements by tobacco industry spokespersons who claim a lack of information indicting smokeless tobacco as a carcinogenic substance; and (5) promotion of smokeless tobacco as a safe way to use tobacco. It is also recommended that smokeless tobacco products be taxed at a higher rate and that an effective public education effort be developed.

86-0926. Bailey, B.J. **Smokeless Tobacco. An Open Letter to the Surgeon General.** *Archives of Otolaryngology* 111(11):707-708, November 1985.

Otolaryngologists and head and neck surgeons need more tangible evidence than just the Surgeon General's personal confidence and optimism (*Archives of Internal Medicine* 145:1581, 1985) that the battle in the area of tobacco-related diseases is being won. Smokeless tobacco presents special problems, including the young ages of users, advertising campaigns with sports celebrities to attract adolescent users, and lack of public awareness of the dangers of prolonged use. The preponderance of scientific evidence supports clinical observations that prolonged use produces serious epithelial changes that lead to disfigurement, disability, and fatal disease. Leadership is necessary within the Federal Government to (1) increase Federal taxation of tobacco products to support expenditures for research, education, and patient care; (2) mount an effective national public health educational program; (3) fund and coordinate investigations into alleviating tobacco addictions; (4) place warning labels on all tobacco products; (5) remove all tobacco product advertising from radio and television; and (6) restrict the sale of tobacco products to persons over 18 years of age. Finally, it is suggested that outside experts be included in the advisory committee (now composed entirely of members of the Public Health Service) recently appointed to oversee and review scientific evidence on health effects of smokeless tobacco.

86-0927. Christen, A.G. **The Four Most Common Alterations of the Teeth, Periodontium and Oral Soft Tissues Observed in Smokeless Tobacco Users: A Literature Review.** *Journal of the Indiana Dental Association* 64(3):15-18, May-June 1985.

Gingival recession, periodontal bone destruction, leukoplakia and other mucosal changes, and tooth abrasion are the four most common alterations in oral soft and hard tissues of smokeless tobacco users. In this literature review it is noted that although the incidence of oral cancer in smokeless tobacco users appears to be low, a number of epidemiological studies and case reports have linked smokeless tobacco use with oral cancer, particularly in the mouth area where the tobacco quid is held. Unless oral cancer is detected and treated at an early stage, treatment is generally quite radical and disfiguring, and may even be followed by a slow, painful death. Smokeless tobacco users, like cigarette users, are likely to become addicted to nicotine, and youthful users may graduate to smoking cigarettes for social and esthetic reasons. Smokeless tobacco use among adolescents in Indiana schools is similar to nationwide patterns (8 to 10 percent), but some classes have reported use as high as 47 percent. Types of smokeless tobacco products, their use, and the effects of advertising on their appeal to adolescents are also discussed.

86-0928. Edwards, S.W.; Glover, E.D. **Snuff and Neuromuscular Performance. (Letter).** *American Journal of Public Health* 76(2):206, February 1986.

A common perception among male athletes is that use of smokeless tobacco enhances reaction time and heightens concentration during an athletic contest. However, data have shown that neuromuscular performance is not enhanced among athlete and nonathlete snuff users over that of athlete and nonathlete nonusers. Although there was no improvement in reaction, movement, or total response time on a common laboratory test, athletes and nonathletes showed 8 and 9 percent increases in heart rate during a 25-minute testing period, accounting for generalized feelings of body preparedness. Given that lower heart rates during rest and exercise are associated with athletic fitness, the snuff-induced heart rate increases are counterproductive and serve to reduce cardiovascular response flexibility. Warning labels on snuff containers, as now required in Massachusetts, are an important first step in communicating dangers of smokeless tobacco to young adults.

86-0929. Glover, E.D. **Conducting Smokeless Tobacco Cessation Clinics. (Letter).** *American Journal of Public Health* 76(2):207, February 1986.

Two pilot cessation clinics for 41 users of smokeless tobacco had only a 2.3 percent success rate over a 6-month period compared with a 38 percent success rate in smoking cessation clinics over the past 9 years. Withdrawal symptoms experienced by snuff-dippers were typical of those in smokers, but of greater intensity. One individual did finally quit, but it took 6 months, using nicotine gum as an adjunct to the cessation program. Participants, all male, ranged in age from 18 to 22 years (mean 20.1 years) and had been using snuff for 3 to 11 years (mean 7.1 years). It is recommended that a model for smokeless tobacco cessation be developed that addresses pharmacological, psychological, personal, and environmental factors.

86–0930. Guggenheimer, J.; Zullo, T.G.; Kruper, D.C., et al. **Changing Trends of Tobacco Use in a Teenage Population in Western Pennsylvania.** *American Journal of Public Health* 76(2):196-197, February 1986.

Adolescent female cigarette smokers outnumbered male cigarette smokers by four to one in a western Pennsylvania survey of 609 students aged 12 to 18 years. Among tobacco users (31 percent), 102 smoked cigarettes, 98 used smokeless tobacco, and 15 used both. Cigarette smokers were predominantly female and smokeless users were predominantly male. Distribution by age and type of tobacco used showed that preference for smokeless tobacco was inversely related to age, with most prevalent use among 14- and 15-year-olds. Among smokeless tobacco users, 17 boys dipped snuff only, 22 chewed tobacco only, and 44 reported using both (chewing and dipping are synonymous in regional vernacular). Concerning health effects, 65 percent of users thought that smokeless tobacco was less harmful than smoking. Among users, 63 percent reported learning about smokeless tobacco from peers, 24 percent from friends or relatives, and 4 percent from advertising media. (Auth. Abs. Mod.)

86–0931. Hunter, S.M.; Croft, J.B.; Burke, G.L., et al. **Longitudinal Patterns of Cigarette Smoking and Smokeless Tobacco Use in Youth: The Bogalusa Heart Study.** *American Journal of Public Health* 76(2):193-195, February 1986.

A decrease in cigarette smoking among white male adolescents was offset by an increase in use of chewing tobacco and snuff, on the basis of results from the Bogalusa Heart Study surveys of tobacco use among Louisiana adolescents during 1976 to 1977 and 1981 to 1982. Smokeless tobacco use doubled over the 5-year period in 9- to 14-year-olds, and tripled in 10- to 15-year-olds. Snuff use increased eightfold in 14-year-olds. Black males showed similar patterns, but to a lesser extent. There was little overlap of cigarette smokers and users of other forms of tobacco. Data also showed that (1) among 223 white males who chewed tobacco, more than half also used snuff with no differences for age; (2) among 123 white males aged 8 to 13 years who used snuff, more than 60 percent also chewed tobacco; and (3) among 49 snuff users aged 14 to 17 years, more than 90 percent also chewed tobacco. Cigarette smoking had decreased from 32 to 17 percent in white males and from 17 to 10 percent in black males. Among white females, smoking declined among 16- to 17-year-olds. Smoking was reduced in all age groups among black females. Cigarette brand selection by children is also documented. The survey covered 2,880 children in 1976 and 2,158 in 1981. It is suggested that studies that find a decline in male adolescent smoking should investigate a possible concurrent increase in use of smokeless tobacco. (Auth. Abs. Mod.)

86–0932. MacLennan, R.; Paissat, D.; Ring, A., et al. **Possible Aetiology of Oral Cancer in Papua New Guinea.** *Papua New Guinea Medical Journal* 28(1):3-8, March 1985.

Although oral cancer, the most common cancer in Papua New Guinea (PNG), appears to be geographically correlated with betel chewing, epidemiological studies are needed to understand its etiology. Most oral cavity cancers occur on the mucosa of the cheek, angle of the mouth, tongue, lip, and alveolus. Overall male to female ratio is 3:4. In PNG, in contrast to most of Asia, unwrapped betel quids are used and tobacco is never added to the mixture of areca nut, betel vine, and lime. Differences in betel chewing habits may have some relevance to incidence of oral cancer. Few case—control studies of betel chewing and oral cancer have been conducted (except in India) and most were inadequately designed. It is suggested that betel chewing, tobacco smoking, and alcohol consumption may produce synergistic effects in the etiology of oral cancer. There is some evidence from animal studies of the carcinogenicity of betel quids. However, addition of tobacco enhanced the carcinogenicity of areca nut extract in another animal study. It is suggested that both betel quid and tobacco may contain carcinogens that initiate early stages of carcinogenesis.

86–0933. Marty, P.J.; McDermott, R.J.; Williams, T. **Patterns of Smokeless Tobacco Use in a Population of High School Students.** *American Journal of Public Health* 76(2):190-192, February 1986.

A survey of prevalence and patterns of smokeless tobacco use by 901 northwest Arkansas students in grades 10 to 12 showed that 161 males (36.7 percent) and 10 females (2.2 percent) had been regular users for 2 to 5 years (46.9 percent) and >5 years (15 percent). Modal responses to frequency indicated a use of 6 to 7 days/week (58.2 percent), from 2 to 3 dips/chews/day (30 percent), and 3/day (52.4 percent). Proportion of users increased through grade levels, and greatest use was reported between grades 10 and 12, citing peer influence as the reason. Other self-reported factors for continued use were relaxation (38.4 percent), enjoyment (17.1 percent), and good taste (15.8 percent). Nonusers were more likely to perceive health consequences of smokeless tobacco use. Only 31 percent of respondents were able to select the list of specific health consequences associated with dipping and chewing from among six options presented. Only 46 (28.2 percent) of the 163 users reported interest in quitting.

86–0934. Osterdahl, B.-G.; Slorach, S. ***N*-Nitrosamines in Snuff and Chewing Tobacco on the Swedish Market in 1983.** *Food Additives and Contaminants* 1(4):299-305, October-December 1984.

Snuff and chewing tobaccos available on the Swedish market in 1983 were analyzed for tobacco-specific and volatile N-nitrosamines using gas chromatography—thermal energy analysis. All 36 snuff samples contained detectable levels of N′-nitrosonornicotine, N′-nitrosoanatabine, N′-nitrosoanabasine, and 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone. Total tobacco-specific N-nitrosamine levels between 2.5 and 51 mg/kg wet weight were found (mean 8.8 mg/kg). Detectable levels of at least two of the four tobacco-specific N-nitrosamines were found in all 18 samples of chewing tobacco. Concentrations were between 0.1 and 7.8 mg/kg (mean 2.1 mg/kg). Levels of volatile N-nitrosamines were much lower: most samples contained <10 μg/kg and the highest concentration found was 550 μg/kg. Since snuff and chewing tobacco contain relatively high levels of carcinogenic N-nitrosamines, it is concluded that users of these products should be warned of the risks of cancer and that efforts should be made to reduce the levels of nitrosamines in these products. (Auth. Abs. Mod.)

86–0935 Russell, M.A.H.; Jarvis, M.J.; West, R.J., et al. **Buccal Absorption of Nicotine From Smokeless Tobacco Sachets. (Letter).** *Lancet* 2(8468):1370, December 1985.

Regular users of "wet snuff" (introduced to Britain in 1985) had blood nicotine levels after 30 minutes equal those obtained from smoking low-tar cigarettes and higher than those obtained from nicotine gum. After using one Skoal Bandits tobacco sachet each, three male former cigarette smokers (aged 30, 45, and 53; weight 84, 70, and 74 kg, respectively) showed a steady increase in plasma nicotine concentration (13.1, 11.3, and 10.4 ng/mL, respectively). By any definition, use of wet snuff sachets is a form of drug-taking and likely to become addictive. Although nicotine absorption is slower than from inhalation of cigarette smoke, the use of one sachet/hour may quickly produce steady-state blood nicotine levels similar to those found in regular cigarette smokers. Smokeless tobacco use by children may produce higher blood nicotine levels than those found in adults. Wet snuff is common in Scandinavia and the United States and its use is increasing, especially among the young. Its unique packaging (teabag-like sachets) may make it appealing to young people as a substitute for smoking. Wet snuff is not only potentially addictive for novices, but also produces buccal leukoplakia, cancer of the mouth, and gum disease. Study results suggest, however, that smokeless tobacco may be of some benefit to adult smokers who are trying to quit.

86–0936. Stich, H.F.; Rosin, M.P. **Towards a More Comprehensive Evaluation of a Genotoxic Hazard in Man.** *Mutation Research* 150(1/2):43-50, June-July 1985.

Users of smokeless tobacco are ideal subjects for evaluating the links between genotoxicity data from in vitro assays and epidemiological data on cancer. Worldwide, more than 600 million persons chew tobacco, either alone or combined with lime, areca nuts, or betel leaves. However, the complexity of the chewing mixtures diminishes the relevance of test results because of potential confounding factors. To solve this problem, a tier system approach was designed. First, individual constituents of tobacco are passed through a spectrum of genotoxicity tests, then the influence of concurrent applications of several compounds is assessed. Using results to choose from among many combinations and permutations, the genotoxicity of a few complex chewing mixtures is tested. Finally, in vitro simulation of conditions in the mouths of chewers is attempted. In vitro results can be correlated with frequency of micronucleated exfoliated buccal mucosa cells of individuals with different chewing habits. The value of applying the micronucleus test to exfoliated buccal cells is that it may be adapted to screening, intervention, and followup studies, and can provide a link between in vitro genotoxicity assays and epidemiological cancer data.

86–0937. Tucker, J.D.; Tongman, O. **Induction of Sister Chromatid Exchanges by Coal Dust and Tobacco Snuff Extracts in Human Peripheral Lymphocytes.** *Environmental Mutagenesis* 7(3):313-324, 1985.

Coal dust, or coal dust plus snuff use, may be responsible for increased frequency of gastric cancer in coal miners. Coal dust and snuff extracts synergistically induced sister chromatid exchanges (SCE) in peripheral lymphocytes from two of three donors, suggesting that use of snuff may create additional health hazards for coal miners. Extracts of sub-bituminous coal dust and snuff were tested separately and together for ability to induce SCEs. Snuff induced a 59 percent increase above background SCE frequency at the highest dose (average of three donors). Coal dust alone nearly doubled SCE frequency, while coal dust plus snuff together nearly tripled SCE frequency. Cell cycle delay was apparent for all three donors at the highest doses for coal plus snuff extract, but no cell cycle delay was seen in cultures treated with coal or snuff extract alone. (Auth. Abs. Mod.)

86–0938. Vainio, H.; Heseltine, E. **Tobacco and Cancer.** *Cancer Research* 46(1):444-447, January 1986.

Analyses of trends and modalities of cancer induction associated with all forms of tobacco consumption indicate that the only way to completely eliminate the risk of cancer is to stop using tobacco. Carcinogenicity of all forms of tobacco was evaluated by the International Agency for Research on Cancer on the basis of a review of all published epidemiological studies, evidence on presence of carcinogenic chemicals within tobacco products, data from experimental animal studies, and evidence from mutagenicity and related tests. It was concluded that (1) all forms of tobacco use are associated with increased frequency of cancer; (2) smokeless tobacco (chewing tobacco, snuff, or betel quid) is causally associated with cancer of the oral cavity and with cancers of upper respiratory and upper digestive tracts; and (3) tobacco smoking (cigarettes, cigars, and pipes) is causally associated with cancers of the lung, bladder, renal pelvis, oral cavity, upper respiratory and digestive tracts, and pancreas.

See also, **86–0734**

TOBACCO PRODUCT ADDITIVES

86–0939. Edwards, W.B., III.; Houminer, Y. **1,4-Diacylpiperazine Flavored Smoking Compositions.** United States Patent No. 4,561,451, December 31, 1985, 6 pp.

The smoking compositions described contain a diacylpiperazine additive such as 1,4-(2-methylpropionyl)-2,3,5,6-tetramethylpiperazine that enhances flavor and smoothness under smoking conditions. The preferred diacylpiperazine compounds are those in which the R^1 hydrocarbyl substituent contains two or more carbon atoms. These compounds are less volatile and tend to exhibit favorable flavorant properties. The compositions described constitute an admixture of (1) combustible filler selected from natural tobacco, reconstituted tobacco, nontobacco substitutes, and mixtures thereof, and (2) between 0.00001 and 2.0 weight percent, based on total filler weight, of a diacylpiperazine additive. Subjective testing found that cigarettes treated with 1,4-diacetyl-2-methylpiperazine had an oily, thin, and sharp taste and those treated with 1,4-di(2-methylpropionyl)-2,3,5,6-tetramethylpiperazine had a smoother and milder taste than control cigarettes.

86–0940. Guess, H.E. **Smoking Article Having Reduced Sidestream Smoke.** United States Patent No. 4,561,454, December 31, 1985, 8 pp.

A commercially acceptable cigarette with an improved wrapping system that limits production of sidestream smoke is described. Sidestream smoke, or smoke emitted from a burning cigarette between puffs, is reduced by double-wrapping the cigarette in paper containing alkali metal salt-burning additives. Although the mechanism of sidestream smoke reduction is not established with certainty, the following hypothesis is suggested. As the cigarette is burned, the burning zone becomes enclosed within the paper and tobacco ash. The paper is impervious to air flow and acts to block the emanation of material that ultimately forms the particulate phase of sidestream smoke. Instead, this material is forced into the burning zone where the components are reduced into lower molecular weight compounds that exit through the tobacco ash primarily as gaseous, invisible sidestream smoke. Wrappers can be made from a low-porosity flax base with the inner wrapper containing 11 percent and the outer wrapper 6 percent potassium citrate. (Auth. Abs. Mod.)

TOBACCO MANUFACTURING AND PROCESSING

86–0941. Egri, L. **Smokable, Coherent Sheet and Method for Its Manufacture.** United States Patent No. 4,564,031, January 14, 1986, 5 pp.

A method for manufacturing a smokable, coherent sheet of disintegrated vegetable materials and/or tobacco waste having good smoke quality, increased filling power, and high moisture resistance is described. The process is claimed to overcome known disadvantages of paper, slurry, and extruder/roller methods. Sheets of smokable material are obtained by pressure-forming vegetable materials and/or tobacco waste together with binding agents and water. While still moist, the sheet is coated with 30 to 50 percent solution or suspension containing a modified pectin in a concentration of at least 0.5 percent final product weight. The esterification of the modified pectin is below 40 percent and/or has an amidation degree of over 15 percent. The modified pectin in the dried sheet is then placed in contact with bivalent and/or trivalent metal ions to form the smokable sheet. (Auth. Abs. Mod.)

86–0942. Gahrs, H.J. **Procedure for Producing Low Nicotine Tobacco by Means of High Pressure Extraction.** United States Patent No. 4,561,452, December 31, 1985, 6 pp.

A high pressure extraction method that removes nicotine from tobacco without affecting other properties, such as aroma, is described. The method is based on knowledge that mixtures of nitrogen and carbon dioxide with specific proportions have a selective dissolving effect on nicotine, although the nitrogen by itself has very low solvent capacity up to 500 bar. A mixture of nitrogen (50 to 80 percent) and carbon dioxide is used under pressures between 250 and 600 bar and at temperatures above 50° C. With the new method the tobacco can be moved directly into the filler swelling procedure immediately after high pressure extraction with only a slight reduction in pressure. (Auth. Abs. Mod.)

86–0943. Gravely, L.E.; Geiss, V.L.; Gregory, C.F. **Process for Reduction of Nitrate Content of Tobacco by Microbial Treatment.** United States Patent No. 4,556,073, December 3, 1985, 9 pp.

The process described reduces the nitrate content of tobacco materials by microbial treatment. Tobacco materials are subjected under controlled conditions to the action of a microorganism that effectively degrades nitrates through a biochemical reaction. A preferred microorganism culture would include *Micrococcus denitrificans*; however, several other microbial species would be acceptable. Tobacco products treated through this process and incorporated into a tobacco smoking product produce a mild smoke through reduced nitrogen oxide and hydrogen cyanide deliveries without loss of flavor, taste, or other smoking properties. (Auth. Abs. Mod.)

86–0944. Gravely, L.E.; Geiss, V.L.; Gregory, C.F. **Process for Reduction of Nitrate and Nicotine Content of Tobacco by Microbial Treatment.** United States Patent No. 4,557,280, December 10, 1985, 9 pp.

The biochemical process described utilizes microorganisms to degrade nitrates and alkaloids (nicotine) in tobacco. The biochemical reaction, under controlled conditions, reduces nitrogen oxides, hydrogen cyanide, and nicotine content of tobacco products, resulting in milder smoke without loss of flavor, taste, or other smoking properties. The microorganism (preferrably *Cellulomonas sp.*) is combined or grown in the presence of a nitrate-containing compound in relatively small quantities. A pure culture of microorganisms simultaneously degrades both nitrate and alkaloids (nicotine). Use of the treated tobacco in a cigarette could contribute toward decreasing delivery of nitrogen oxides, hydrogen cyanide, and nicotine. (Auth. Abs. Mod.)

86–0945. Jessup, T.D.; Hudson, A.B. **Cigarette Filter Assembly.** United States Patent No. 4,564,030, January 14, 1986, 5 pp.

A tobacco smoke filter that enhances the taste of a ventilated cigarette through improved construction is described. The filter permits diluting air to enter a mixing chamber where the air and smoke commingle prior to entering the smoker's mouth. Perforations in the filter assembly facilitate a more direct mixing of outside air with smoke. The filter avoids airstream channeling and smoke stream compression, enabling full cross-section use. Filter cigarettes constructed in accordance with design specifications were judged to have significantly enhanced taste characteristics: the nicotine-to-tar ratio was 1.5 and the menthol transfer efficiency value was 1.7. A typical cigarette at a comparable particulate matter level generally has a nicotine-to-tar ratio of approximately 1.0 and a menthol transfer efficiency of about 1.3. (Auth. Abs. Mod.)

86–0946. Litzinger, E.F., Jr. **Filtered Cigarette.** United States Patent No. 4,557,281, December 10, 1985, 5 pp.

The filtered cigarette described includes an air-impermeable plug formed with longitudinal grooves to lower tar content through air ventilation. By introducing ambient air into the filter, the quantity of smoke particulates and gas phase components inhaled by the smoker are reduced. The impermeable plug and the filter rod are surrounded by air-permeable tipping material that overlaps and holds the tobacco column adjacent to the plug. As the smoker draws on the cigarette, unfiltered smoke is drawn into the grooves and ambient air is drawn into the grooves through the perforations in the tipping material and through the permeable wrap. Unfiltered smoke and air comingle in the grooves to dilute the smoke with substantially no smoke flowing through the body of the plug. The diluted unfiltered smoke passes from the longitudinal grooves through the filter rod and is discharged into the smoker's mouth. (Auth. Abs. Mod.)

86–0947. Sachleben, L.R.; Korte, K.R.; Snyder, D.D., et al. **Process and System for Making a Blended Tobacco Product.** United States Patent No. 4,566,468, January 28, 1986, 10 pp.

The tobacco treatment and blending method described removes a majority of nitrates from smoking tobacco in a relatively short period of time. Tobacco with high nitrate content (e.g., burley tobacco) is continuously passed through dissolution for nitrate removal. A solvent is added to the tobacco to form a slurry. The free solvent, including dissolved nitrates, is decanted from the slurry and the remaining saturated burley tobacco is squeezed for further removal of solvent and dissolved nitrates. Processed tobacco is mixed with another tobacco (e.g., flue-cured tobacco), expanded, and dried. The mixture is then bulked to insure a continuous uniform quantity of tobacco mixture after the expansion and drying stage. (Auth. Abs. Mod.)

86–0948. Seragnoli, E.; Mattei, R. **Method and Apparatus for Forming Perforation in Bar-Shape Articles.** United States Patent No. 4,565,202, January 21, 1986, 7 pp.

A laser ray perforating device applicable to the manufacture of ventilated cigarettes is described. Ventilated cigarettes require multiple perforations (holes) in the filter area to allow a certain percentage of external air to be drawn by the smoker for diluting smoke and lowering temperatures. The described method, claimed to be more advantageous in both efficiency and cost than currently used procedures, facilitates the perforation process by rotating the cigarette along a determined path on a conveyor as it is advanced. One laser generator unit is utilized for each ring of perforations. Detailed drawings are included. (Auth. Abs. Mod.)

TOBACCO ECONOMICS

86–0949. Ahmad, M. **Cigarette Price War Threatens Profitability.** *Tobacco Reporter* 112(12):20-22,24, December 1985.

Inefficiency plagues Pakistani cigarette companies, keeping profits low and hindering efforts to modernize factories. A cigarette price war further threatens profits. The industry earns only about 2 percent pretax profit over turnover, encouraging rumors of massive tax evasion. Inaccurate premarket assessments of 1984 production caused panic buying of substandard tobacco at exorbitant prices. Despite the advice of the Pakistan Tobacco Board, an area much larger than needed was allocated in 1985, resulting in surplus production of good quality flue-, air-, and sun-cured rustica. Balanced fertilization has further increased the yield and quality of tobacco. Operating at 62 percent efficiency, the cigarette industry is further hampered by an excise duty structure that ensures maximum return to the exchequer. Inflationary trends in raw material prices, especially tobacco, also impede growth. Of 25 cigarette manufacturing companies, 5 remained partially or fully inoperative during 1984 and 1985. Despite domestic problems, exports increased 46 percent in 1984, with foreign sales at an all-time high of 1.92 billion pieces. Premier Tobacco Industries was the largest exporter. Although exports declined during the first 6 months of 1985, they are expected to recover by the end of the year.

86–0950. Cohen, M.B.; Lind, L.J. **The Cigarette Pack Expands. (Letter).** *New England Journal of Medicine* 313(25):1612, December 19, 1985.

The tobacco industry in a ploy to increase cigarette consumption has begun to package cigarettes in packs of 25 to 30 instead of the standard 20. "Packs per day" is a common measure of cigarette consumption, and the health community should be aware that a "pack per day" may no longer mean what it used to mean. Despite the industry's claim that the change was made for convenience, it must be remembered that tobacco companies' only purpose is to sell tobacco, regardless of consequences.

86–0951. De Jong, D.W. **The Role of American Tobacco Leaf Chemistry in Low-Yield Cigarettes: An Agricultural Viewpoint.** *Tabak Journal International* 5:376, 378, 380, 382-383, October 1985.

American tobaccos provide nitrogenous flavor components that impart "strength" to modern blends, but the amount of high-nicotine American tobaccos needed is limited and the United States is finding it increasingly difficult to compete with other tobacco-growing countries. In spite of the assumed superior quality of American leaf tobaccos, there has been serious erosion of market demand in recent years. Cost differentials are only part of the problem. Data show that American tobaccos of all types have undergone cumulative increases in total nitrogen and nicotine levels in conjunction with yield increases, attributable to changes in genetic and agronomic practices. High nitrogen tobaccos with appropriate chemical balance have a vital, although constricted role in low-yield cigarette blends. Foreign tobaccos are invariably much lower in nitrogenous components, but provide filler style leaf materials necessary for manufacture of low-tar and low-nicotine cigarettes, which supply over 50 percent of the current U.S. cigarette market. (Auth. Abs. Mod.)

86–0952. Field, A.D. **South Africa Striving Towards Self-Sufficiency.** *Tabak Journal International* 5:360-361, October 1985.

South African growers are anticipating a bumper crop of above normal quality tobacco (largest in the last 6 years). The country's tobacco economy, based on a policy of self-sufficiency, interrelates production of leaf tobacco with domestic consumption trends. The upward trend in consumption over the last decade, however, has begun to slow down. Actual cigarette consumption declined from a record high of 28,911 tons in 1982 to 27,430 tons in 1985. Pipe and snuff tobacco use increased over the past 2 years and sales of other tobacco products offset the decline in cigarette consumption. Most tobacco-producing areas have suffered from severe drought, which affected the greater part of southern Africa during the past 2 years, but production levels managed to increase to 38.7 million kg in the 1983/1984 season. With inconsistent leaf production as a result of climatic conditions, some leaf was imported to supplement domestic demand. A rising trend of imported cigarette brands (90 percent from the United States) is also of some concern. South African exports, averaging 3,800 tons annually, have also been affected by climate conditions, limiting South Africa's ability to ensure continuity of supply to a large external customer base. (Auth. Abs. Mod.)

86–0953. Maury, G., Jr. **The Flue-Cured Tobacco Program: Write Its Obituary and Start Over.** *Tobacco International* 187(19):31-32,34, September 1985.

The original tobacco program was based on a sound formula that called for support prices regulated by the cost of living index. With every increase in support price over the years, there has been increased production of tobacco overseas. Percentage of U.S. trade has decreased accordingly and imports of cheaper foreign tobacco have increased. Had the original price support formula not been abandoned, there would be no problem in the flue-cured tobacco program today. The unrestricted allocation of tobacco quotas by Congress has allowed quota owners, with no risk or effort on their part, to collect over 2 billion dollars over the last decade or so from nonquota tobacco planters. With total disregard for the cost of planting tobacco, the increase in pool inventory, and the competition from foreign tobacco growers, Congress scheduled increases in support prices. The Cost Program Act of 1982 was a political compromise over which the farmers had no control, nor were they consulted. High support prices were set by Congress, not by the farmers. It is suggested that growers organize and seek relief through the courts to oppose the 25-cent/pound assessment. Liquidation of the pool inventory will cost millions of dollars, but it must be sold (at any price obtainable) through an orderly process.

86–0954. Quatraro, A. **Spain's EEC Accession Raises Unwanted-Tobacco Boom Fear.** *World Tobacco* 91:53-55, 58-59, December 1985.

Spain's accession into the European Economic Community (EEC) is destined to have considerable impact on the tobacco industry within EEC, and a "bold, energetic" policy is being proposed to prevent a massive increase in production of unwanted tobacco varieties and a consequent growth in spending by the European Agricultural Guidance and Guarantee Fund. Spain, like EEC as a whole, is about 48 percent self-sufficient in tobacco. Only 2 percent of Spain's imported tobacco comes from EEC countries. The main worry is that substantial quantities of unmarketable tobacco may be sent into Intervention. The chief danger is that EEC regulations are more favorable to the Spanish tobacco industry than present domestic regulations. It is proposed that (1) the commission staff be especially vigilant in preventing any explosion in production, any falling-off in quality, and any excessive use of Intervention measures; and (2) varietal conversion be continued and regulations be enacted so that growers do not carry out conversion on their own initiative. EEC membership means higher prices for cigarettes for Spanish smokers, but a swing to foreign brands after Spain joins is not anticipated.

86–0955. Tabak Journal International. **Sales Situation on the European Cigar Market.** *Tabak Journal International* 5:404-405, October 1985.

Sales of cigars and cigarillos declined 3.7 percent during 1984 compared with 1983 in the 10 countries of the European Economic Community. The greatest decline was in Ireland, where sales dropped from 72 million to 68 million pieces (5.6 percent). The smallest decline was in Italy, with only a 1.1 percent drop in sales. The largest markets in 1984 were West Germany (1,740 million pieces), France (1,550 million pieces), and Great Britain (1,445 million pieces). Sales of cigarillos have been better during the past few years, and it is expected that this trend will become even stronger in the future. Problems in the industry are due to the current shortage of wrapper tobaccos and resulting high prices. (Auth. Abs. Mod.)

86–0956. The Tobacco Institute. **The Tax Burden on Tobacco.** Tobacco Institute Historical Compilation, Volume 20, Washington, D.C., 1985, 200 pp.

Federal, State, and municipal excise taxes on cigarettes for the fiscal year ending June 30, 1985, amounted to nearly 9.1 billion dollars, or approximately 38 dollars for every man, woman, and child. Since the Civil War, tobacco taxes have yielded the Federal Government more than 100 billion dollars; the States have received another 80 billion dollars. Although amounting to a "Golden Egg," these excises on the Nation's most heavily taxed consumer products are inequitable and regressive. Except for comparatively modest expenses for tobacco agriculture support programs in the past 50 years, the Federal Government has used tobacco revenues for the benefit of all citizens, whether or not they buy tobacco products. Clearly, political considerations have outweighed economic principles of equity and fairness. Figures and tables provide data on Federal, State, and local tax rates, changes in tax rates, tax revenues collected, history of Federal tax rates, and other excise tax information. (Auth. Abs. Mod.)

86–0957. Tobacco International. **China. CNTC, World's Largest Cigarette Maker, Seeks Worldwide Advice.** *Tobacco International* 187(19):7-10, September 20, 1985.

Cigarette smoking is considered a status symbol in China, and despite antismoking campaigns (which apparently are not effective), high prices, and official warnings, many people seem determined to smoke: one of every four males in China is a smoker. The rate of smoking is rising (3 to 4 percent annually), which is faster than the annual increase in the birth rate (1 percent). However, only about 2 percent of women are smokers. Tobacco, which is heavily taxed, is a source of government revenue. Between 80 to 90 percent of all cigarettes smoked in China are English style; 3 to 4 percent are American style. Only 13 percent of cigarettes are filtered, and tar delivery is between 20 and 35 mg. Herbal cigarettes (a Chinese specialty) contain 15 mg tar/cigarette. Of the three or four main classes of cigarettes, the top class sells for the equivalent of 60 cents a pack (8 percent), the medium class for about 33 cents (43 percent), and the low class between 15 and 22 cents (49 percent). The largest of 146 manufacturing plants (29 for cigars, 117 for cigarettes), which is in Shanghai, produced 42.5 billion cigarettes in 1984. Total annual production from all plants is approximately 1.05 trillion cigarettes. The Chinese tobacco industry is the world's largest, but certainly not the most advanced. Most manufacturing machines now in use produce 1,000 cigarettes/min, at a time when state-of-the-art machines produce up to 8,000 cigarettes/min. China has a lot of catching up to do; however, the open trading policy now in effect will bring increased technology, which is expected to solve many of the current problems. (Auth. Abs. Mod.)

86–0958. Weiss, E.A. **Australian Tobacco Market Static and Competitive.** *Tabak Journal International* 5:409-410, October 1985.

Barely thriving in a hostile environment, the Australian tobacco industry managed a 1 percent increase in cigarette sales in 1984, but total sales were still nearly 8 percent below those of 1982 and 1983. Constant governmental pressure on consumers through antismoking campaigns, on industry profits through substantial increases in excise taxes, and on sporting bodies through withdrawal of sponsorships has had an adverse effect on cigarette sales. The major factor in the sharp decline in sales was imposition of a 20 percent increase in the Federal excise tax (in addition to State taxes). Major tobacco companies have managed to remain profitable only by increasing efficiency and consolidation. New and much stronger health warnings have been proposed for cigarette packs and new regulations require that 20 percent of space in all tobacco advertising be devoted to health messages, including cinema advertising. The industry has criticized warnings as being unsupported by current scientific research. Introduction of packs containing more cigarettes has achieved significant and growing market penetration. Market share is 26 percent for the 30-pack, 50 percent for the 25-pack, and 24 percent for the 20-pack. Australian tobacco growers face decreasing profit margins unless export sales can be generated, a task that may prove difficult owing to present world overproduction. (Auth. Abs. Mod.)

86–0959. World Tobacco. **Pakistan to Satisfy Local Leaf Needs.** *World Tobacco* 91:42-43, December 1985.

Cigarette sales in Pakistan declined 9.6 percent in the first half of 1985 as a result of continued consumer resistance to price increases, which reflect the additional 2 percent excise duty imposed in June 1984. Seventy-two percent of the retail price of cigarettes now goes to the Government as excise revenue. Although the Government claimed that the increase was aimed at helping to curb smoking, most observers believe that it was simply a means of raising additional revenue to help meet a budget deficit. Filter cigarettes constitute about 70 percent of Pakistan's market, compared with 51.1 percent in 1983 and 58 percent in 1984. Tobacco exports, primarily to EEC countries, Chile, Bulgaria, Sri Lanka, Indonesia, Egypt, and Jordan, have been halved since the late 1970s. Production has increased despite problems associated with weather, soil-borne diseases, lack of crop rotation, and waterlogging, but lack of an inexpensive, convenient, and practical fuel for flue-curing has reduced Pakistan's competitiveness in the world market. Restrictions on television advertising have been in effect since 1980 when the Government adopted an antismoking attitude, but the ban is not closely supervised.

86–0960. World Tobacco. **How the Brands Ranked. Maxwell International Estimates.** *World Tobacco* (91):46-47, 50, December 1985.

The United States was the world leader in cigarette sales in 1984 with 600,230 million pieces. Brand rankings showed Marlboro in the lead with 21.5 percent of total sales, followed by Winston with 11.7 percent, Salem 8.1 percent, Kool 7.0 percent, Benson and Hedges 4.9 percent, Camel 4.5 percent, Merit 4.3 percent, and generics (Liggett and Myers) 4.0 percent. In Brazil, second in world sales with 126,200 million pieces, the Hollywood brand claimed 22.8 percent of the market. The most popular brand in Spain was Ducados, 35.1 percent of the 74,200 million pieces sold. Player's Light captured 11.2 percent of Canada's 61,700 million pieces sold. The next five highest producing countries were Mexico, 48,500 million pieces (Raleigh, 25.5 percent); Egypt, 44,000 (Cleopatra Super, 66.8 percent); Argentina, 38,900 (Jockey Club, 15.7 percent); Thailand, 29,600 (Falling Rain, 82.7 percent); and South Africa, 28,900 (Lexington, 14.2 percent). Canary Islands sold 4,400 million pieces (Winston, 26.2 percent); Ecuador, 3,930 million (Lark, 27.6 percent); Puerto Rico, 3,500 million (Winston, 73.1 percent); Nicaragua, 2,300 million (Royals, 81.9 percent); and El Salvador, 2,100 million (Delta, 57.9 percent). The market share for filtered cigarettes continues to increase; in Argentina, Egypt, and El Salvador, they claimed 99.9 percent of the market and were more popular in Puerto Rico (98.5 percent), Canada (98.0 percent), Spain (97.4 percent), Brazil (95.6 percent), and the Canary Islands (94.2 percent) than in the United States (93.8 percent). Brand rankings and world sales for 1983 and 1982 are also tabulated.

86–0961. Zverev, I. **A Tobacco Industry Notebook From the Soviet Union.** *World Tobacco* 91:116, December 1985.

The decline in per capita tobacco consumption in the Soviet Union is expected to continue as a result of antismoking campaigns led by medical workers and supported, paradoxically, by tobacco growers. About 30 percent of the population smokes an estimated 1,500 cigarettes/year. Two-thirds of the smokers are under 40 years of age. Smoking is heaviest in Transcaucasia, the Baltic republic, and Moldavia, and much lighter in Central Asia, the Russian Federation, the Ukraine, and Byelorussia. Efforts to produce higher quality cigarettes have inspired cooperation with the British tobacco industry and commercial relations with Bulgaria and Czechoslovakia. Experiments in cultivating Virginia-type tobacco have produced a high-quality grade competitive with U.S. tobacco. During the last decade, commercial experiments cultivating this variety have been conducted in Moldavia, where 1,700 ha (4,200 acres) have been planted. The C-6B hybrid developed in the United States is also promising. Various governmental efforts to assist tobacco growers are described.

See also, **86–0966**

LEGISLATION

86–0962. Simpson, D. **Future of Low-Tar Cigarettes. (Letter).** *Lancet* 2(8468):1359-1360, December 1985.

The main thrust of public health strategy on low-yield cigarette policy should be firm Government directives to tobacco manufacturers, backed up by legislative powers, to reduce emission levels in accordance with independent scientific advice. This is what is done with pharmaceuticals and would happen automatically for cigarettes if tobacco were to be included under the Medicines Act, as was proposed by a former ministerial team at the Department of Health (who were unexpectedly removed to other posts). The tobacco industry has consistently tried to use the issue of less dangerous cigarettes for its own ends. It has even agreed to cooperate on various aspects of emission reduction if freedom to promote cigarettes is not further restricted. The industry continues to invest in research to produce a "safer" cigarette, meaning a less lethal one. The tobacco industry should not be allowed to participate in determine policy on smoking, other than to implement what is ordered by the Government.

86–0963. Wood, M. **The Winds of Change.** *Tobacco Reporter* 112(12):26-28, 30, December 1985.

Uncertainty haunts the future of the U.S. tobacco program, burdened by growing surplus stocks, a nationwide agricultural credit crisis, and antismoking advocates. Legislation working its way through Congress would establish (1) a more market-oriented price-setting mechanism, (2) production controls based on buying intentions of domestic cigarette manufacturers and export demand estimates, (3) minimum government surplus levels, (4) an industry/grower cost sharing on surplus stocks, and (5) an 8-year domestic cigarette manufacturer buy-out of current government surplus stocks. A budget bill increasing the Federal excise tax on cigarettes to 16 cents/pack may include earmarking the additional revenue for Federal health care programs. Growing frustrations among flue-cured and burley growers over falling net returns have raised speculation that the tobacco program may be voted out. Tobacco consumption is also being pressured, primarily from a spreading social perception of smokers as second-class citizens, by restrictions on smoking, rising costs, and health concerns. Cigarette sales have recovered from a tax-induced drop 2 years ago, but have not increased. Although sales of other tobacco products have dropped, moist snuff sales have gained (4.6 percent in the first half of 1985). The Government collected 10.1 billion dollars last year (99 percent on cigarettes). Taxes account for about 33 percent of the retail price of a pack of 20 cigarettes.

See also, **86–0920, 86–0965**

GENERAL

86–0964. Ashley, M.J. **Smoking and Women.** In: Forbers, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 7-24.

Long-term trends and current patterns of smoking among women and health consequences with emphasis on maternal smoking behavior and smoking cessation are examined. Over the past 15 years, smoking has declined more among men than among women and smoking patterns have become relatively the same for both sexes. Even with the decline in smoking, significant numbers of North Americans will suffer unnecessary morbidity, disability, and mortality. As men and women become more alike in smoking behavior, so will the associated risks of lung cancer. In 1969, lung cancer incidence was twice as high in men as in women; by 1979, incidence rates were nearly identical. Incidence of chronic obstructive lung disease in women is approaching that of men, as are the risks of coronary heart disease. Smoking among women also increases the risk of peripheral vascular disease, subarachnoid hemorrhage, and malignant hypertension. The risk of myocardial infarction and subarachnoid hemorrhage among women who smoke heavily and use oral contraceptives has increased by 39 times. Smoking lowers the age of natural menopause, and early reduction in endogenous estrogens may account for osteoporosis incidence in women who smoke. Adverse maternal outcomes of pregnancy (i.e., premature rupture of membranes, bleeding, and spontaneous abortion) are also risks of smoking. Methods for smoking prevention and control in women are also discussed.

86–0965. Begin, M. **Address to the Fifth World Conference on Smoking and Health.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume

1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 25-30.

In Canada, voluntary agreements with the tobacco industry have led to (1) withdrawal of tobacco advertising on radio and television, (2) limitation of annual tobacco promotional expenditures, (3) limits for tar and nicotine yields/cigarette, and (4) placement of health warnings on cigarette packs. The industry has recently voluntarily expanded agreements to include health warnings and tar/nicotine yield information on all foreign cigarettes sold in Canada and on all packages of cigars. Each company has been asked to also reduce more hazardous constituents of cigarette smoke and to reduce average tar and nicotine yields to 12 mg and 1 mg, respectively. Governments, health agencies, and professionals are cooperating in planning and developing smoking prevention and cessation programs. Federal jurisdiction will prohibit smoking in public areas, utilizing guidelines introduced on a voluntary basis. Carriers are voluntarily enforcing measures to restrict smoking in public transportation vehicles. Health agencies are working actively in a concerted effort to inform and educate the young on the hazards of smoking and to assist smokers who want to quit. It is anticipated that continued collaboration will reduce tobacco consumption, reduce involuntary exposure to secondhand smoke, and prevent initiation of smoking during childhood and adolescence. Trends in smoking, particularly among women and children, are noted, as is the economic impact of smoking on health and productivity.

86–0966. British Medical Journal. **Taking Money From the Devil.** *British Medical Journal* 291(6511):1743-1744, December 21, 1985.

The case against taking money from the tobacco industry for research is easy to make because only those with vested interests can deny the harm done to health by tobacco. The industry has tried to buy respectability by investing over 11 million pounds in the Health Promotion Research Trust, established 3 years ago. It is argued that taking money from the trust gives undeserved respectability to the tobacco industry, and that money from the trust may buy off an influential and articulate opponent. Also, the money may influence the research, and the knowledge of who is paying the bills may influence results. While the case against taking money from the alcoholic drink trade may seem more complicated, because of dubious evidence that suggests that only a minority of drinkers are harmed in any way, the argument is fallacious. The drink trade is committed to selling as much alcohol as it can, and the evidence is incontrovertible that the more alcohol a society consumes the more damage it will suffer. The food and drug industries are not immune to similar arguments. The arguments against taking money from these industries operate even more strongly when it comes to writing reports. The public is rightly suspicious when a report sponsored by a marketing board suggests that increased consumption of their product is associated with lower mortality. It is recommended that the Government find the money to back the necessary research, possibly by increasing taxes on tobacco and alcohol.

86–0967. Calabrese, E.J. **Does Exposure to Environmental Pollutants Increase the Need for Vitamin C?** *Journal of Environmental Pathology and Toxicology* 5(6):81-90, July 1985.

Broadening the Recommended Dietary Allowances (RDA) for ascorbic acid to include effects of ubiquitious pollutants on human health, particularly that of smokers, is discussed. Smoking is one of the most realistic and quantifiable threats of environmental factors affecting ascorbic acid nutritional status. Studies indicate that smokers of 20 or more cigarettes/day exhibit a 40 percent reduction in median serum Vitamin C levels compared with nonsmokers. Median serum vitamin C levels of both male and female smokers in Canada who consumed between <30 mg of ascorbic acid/day were quite low, especially for Quebec males whose intake of 22 mg percent and below suggested subclinical scurvy. Findings are considered significant because (1) millions of smokers are affected; and (2) smokers on inadequate or marginally adequate diets may be deficient in vitamin C. Ascorbic acid nutritional status markedly affects toxicity and/or carcinogenicity of more than 50 pollutants in air, water, and food. However, some studies have indicated that ascorbic acid may also enhance the toxicity of compounds such as cyanide, mercury, and lead. It is concluded that present knowledge about ascorbic acid influences is too incomplete to warrant changing the RDA. (Auth. Abs. Mod.)

86–0968. Chandler, W.U. **Banishing Tobacco.** Washington, D.C., Worldwatch Institute, Worldwatch Paper 68, January 1986, 47 pp.

Tobacco causes more death and suffering among adults than any other toxic material in the environment, and the worldwide cost in lives is nearing 2.5 million/year or 5 percent of all deaths. Although the health consequences of tobacco are now well known, prevention policies lag far behind. No national tobacco control effort has been launched with the vigor of campaigns against drugs or toxic chemicals, even though hard drugs and chemicals claim far fewer victims than tobacco. Health leaders in government, international organizations, and public interest groups are failing in the fight against tobacco, partly because tobacco is tenaciously addictive, partly because both governments and industry promote tobacco, and partly because the leadership of health and environmental authorities has been weak. This conclusion is borne out by the continued high levels of tobacco use in industrialized countries, and the explosive growth of cigarette smoking in Eastern bloc countries and in China. Six major areas are covered in this report: (1) The Epidemic Spreads, discussing world tobacco use; (2) The Direct Cost of Addiction, concentrating on tobacco-related diseases and deaths; (3) Victims of Others' Smoke, covering effects of passive smoking; (4) Effects on Children, tracing prebirth and postbirth consequences; (5) Antismoking Efforts to Date, citing national tactics; and (6) Stronger Medicine, promoting more effective strategies.

86–0969. Chase, G.R. **Criticism of Mathematical Approach to Compensatory Issue. (Letter).** *Journal of Occupational Medicine* 27(12):862, December 1985.

In response to criticism of a mathematical approach to the issue of compensation for asbestos-exposed workers (*Journal of Occupational Medicine* 27(12):861-862, December 1985), the belief is affirmed that failure to adopt an approach that takes into account both degree of exposure and other risk factors has led to gross inequities. If two individuals who worked side by side in a World War II shipyard for 4 years doing noninsulation work developed lung cancer in 1981, the relative risk would be 1.45. A traditional attributable risk calculation using 1.45 would result in an attributable risk of 0.31 for both individuals. Suppose both smoked 10 cigarettes/day, but one stopped smoking in 1960 while the other continued smoking, and suppose the ex-smoker had a lower lobe cancer with an ILO reading of 1/2 and the smoker had an upper lobe cancer with 1/0 from the ILO classification. If both had started smoking at age 20 and were aged 60 at time of diagnosis, the apportioned risks are 0.56 and 0.07 for the ex-smoker and smoker, respectively. The use of only a relative risk of 1.45 for both to guide a compensation determination is believed to be clearly inappropriate. This, admittedly, represents a social judgment. The issue is not with what total liability should be borne by the asbestos industry, but with the equitable distribution of available funds among many claimants. See also 85-1015, 86-0982.

86–0970. Femi-Pearse, D. **Smoking in Developing Countries.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 59-69.

Successful antismoking efforts that would have credibility in the Third World and could be implemented by individuals, societal groups, and governments include (1) cessation of smoking by parents, health professionals, workers, and other opinion molders; (2) cessation of smoking at meetings and social gatherings; (3) health education in schools for students and teachers on the effects of smoking; (4) warning statements on packages and on individual cigarettes; (5) ban on smoking in public utilities, buses, trains, cinemas, airports, and stadiums; (6) ban on direct advertising in media and on billboards; (7) ban on indirect advertising, such as sponsorship of sports, television quizzes, games, and other events; (8) tar and nicotine content labels on cigarettes; (9) tar and nicotine limits for cigarettes; and (10) ban on cigarette sales during "smokeless days" (India). The advantages of tobacco (profitable crop for farmers and source of revenue for governments) are discussed. Incidence of smoking among schoolchildren in Uganda, Nigeria, Ethiopia, Senegal, Ghana, Zambia, and China is charted, and reasons for smoking are surveyed. Prevalence of smoking among adults and incidence of tobacco-related diseases in various Third World countries are also discussed.

86–0971. Fielding, J.E. **Smoking. (Letter).** *New England Journal of Medicine* 314(3):180-181, January 16, 1986.

In reply to various criticisms (*New England Journal of Medicine* 314(3):180-181, January 1986) of an earlier report (*New England Journal of Medicine* 313(8):491-498, August 22, 1985; 313(9):555-561, August 29, 1985), it is argued that the thousands of reports published yearly on the health effects and control of smoking precludes a comprehensive review in one article. Although the suggestion that physicians be exhorted not to smoke and to become active advocates of cessation of smoking is considered well taken, the decline in smoking among physicians has been striking. From 1945 to 1975, the proportion of internists who reported currently smoking dropped from 60 to 17 percent and informal surveys of medical students suggest that prevalence of smoking is less than 5 percent. It is encouraging that physicians are getting the message, even if cessation of smoking is not the top priority. See also 86-0067, 86-0649, 86-0755, 86-0848, 86-0855, 86-0973.

86–0972. Godber, G. **Presentation to the Fifth World Conference on Smoking and Health.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 71-75.

Evidence of the causal relationship between smoking and lung cancer was shown in 1950, but suggestions of such a link were expressed as early as the 1930s. By 1967, it had been shown that smoking caused far more illness and death from other diseases than from cancer and that stopping smoking reversed the effect. Looking back, three distinct phases stand out: (1) a period of proving the case; (2) a period of seeking ways to convince the public and governments (while the industry strove to protect its market); and (3) a period of intensive study on ways to escape the habit, which led to recognition of the nature of nicotine addiction. The industry appeared to accept smoking as unsafe, but continued to promote its product. A worldwide reaction against a worldwide threat is now needed because smoking is being promoted in less developed countries. The formula remains the same: (1) stop commercial promotion of tobacco products; (2) limit smoking in public places; (3) increase the cost of smoking; (3) reduce the harmfulness of smoking materials; and (4) improve health education, especially of the young. Legislation is needed against the promoters and reinforcers of tobacco addiction. (Auth. Abs. Mod.)

86–0973. Goldstone, R.A. **Smoking. (Letter).** *New England Journal of Medicine* 314(3):180-181, January 16, 1986.

The medical profession has a greater obligation than to merely provide more education as suggested earlier (*New England Journal of Medicine* 313(8):491-498, August 22, 1985; 313(9):555-561, August 29, 1985). It should be clear that changes in lifestyle are needed, because as long as physicians and other health professionals smoke; as long as physicians are seen smoking in hospital lounges, cafeterias, and corridors; as long as hospitals reap profits from cigarette sales; and as long as physicians permit smoking in their offices and waiting rooms, they are forsaking their medical heritage and obligations. See also 86-0067, 86-0649.

86–0974. Gray, N. **The Social and Economic Implications of Tobacco Use.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 77-92.

Social and economic implications of tobacco use in Australia and developed countries are analyzed as a policy base for devising techniques to handle tobacco-related problems in less developed countries. The costs of having a tobacco industry (e.g., loss of productivity from illness and death and medical and pension costs) are shown to outweigh or cancel any benefits (tax income, wages, exports, advertising, and other financial dividends). Problems related to cigarette smoking in affluent countries are compounded by use of chewing tobacco products in less affluent countries. Preventive strategies are suggested for mature markets and for immature markets that take into consideration indigenous smoking and chewing habits. Patterns of cancer (which differ from those associated with western-type cigarettes) are traced for major Asian and African countries. Finally, antismoking activists are alerted to international behavior patterns of governments and various cigarette manufacturers, including (1) export of tobacco surplus; (2) export of high-tar cigarettes; (3) export of improperly labeled cigarettes; (4) international agency funding of tobacco; and (5) stimulation of world tobacco production by cigarette manufacturers.

86–0975. Harken, D.E. **The Tragedy of Tobacco. (Letter).** *Journal of Thoracic and Cardiovascular Surgery* 90(5):794, November 1985.

The tragedy of tobacco, particularly cigarettes, has affected the sensibilities of physicians for years. Those involved in the treatment of lung cancer and emphysema have been challenged by the certainty of a causal connection with cigarettes. Litigation against tobacco companies had little success in the past but times have changed: (1) causal connections have been established, (2) the climate of litigation has changed to make the cases of victims (often patients) more successful, and (3) concerned lawyers have organized nationally to supply briefs for patients. Most physicians already urge patients and the public to quit smoking, and helping patients to obtain proper indemnification may constitute yet another means of public service.

86–0976. Hynd, S. **Introductory Remarks at the Opening Plenary Session.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 93-94.

Africa, which includes many developing countries, has come to the attention of the tobacco industry. Africa is already struggling to overcome the health hazards of communicable, diarrheal, respiratory, nutritional, and parasitic diseases, and now it will have to contend with smoking-related diseases. Protests against nuclear warfare are heard around the world, yet there is little protest against tobacco, the major preventable cause of disease. Africa cannot attain the World Health Organization's goal of "Health for all by the year 2000" while burdened with poverty, ignorance, and disease and exploited by affluent, educated countries. In Swaziland (visited recently (for the first time) by a marketing agent of a major international tobacco organization), when word leaked out about impending legislation to control smoking, tobacco industry lobbyists went into action. Developing countries must find the right tools and must use them to combat the tobacco industry, which has power, organization, and money.

86–0977. Mahler, H. **Message to the Fifth World Conference on Smoking and Health.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 95-97.

The most alarming tobacco-related health trend today is the increase in consumption in developing countries. In some, smokers form the majority. International tobacco companies are concentrating sales efforts in such countries to offset declining sales in industrialized nations. People in developing countries must be influenced not only to stop smoking but also to make other radical lifestyle changes, i.e., eating wisely, drinking moderately, driving carefully, exercising regularly, and learning to live with stress. People must also act as agents of change to prevent developing countries from becoming dumping grounds for highly toxic cigarettes that lack health warnings, which can no longer be sold in industrialized countries. Health professionals must take an active role in fighting the smoking epidemic through personal example. Imaginative ways must be created to influence young people to assume responsibility for their own health. The educational system must be more effective in getting the right messages across. Only then can legislation, supported by an informed public, be effective in dealing with the smoking problem.

86–0978. Mason, R.J. **Should Chest Physicians be Passive on Smoking?** *American Review of Respiratory Disease* 133(1): January 1986.

Most chest physicians have been too passive on the subject of smoking. If physicians would simply tell patients who smoke about risks of lung cancer, emphysema, and coronary heart disease and urge each patient to quit, the probable success rate would be about 5 percent. Assuming all 50,000,000 current U.S. smokers see a physician in a given year, this simple effort would produce 2,500,000 ex-smokers. There is little disagreement on the health effects of direct cigarette smoking, but people still smoke. This is especially disturbing because of the prevalence of smoking among young women and men, and even among pulmonary physicians and their spouses. Extensive smoking occurs in other countries at all ages, and sadly for us, the United States is a major exporter of cigarettes. Current data indicate that passive smoking carries a significant risk to the public and should be curtailed. There is no proven threshold for exposure to cigarette smoke that carries no adverse health effects. Physicians must take a position against allowing smoking in public places such as schools, restaurants, airports, government buildings, and hospitals. If society is to rid itself of the major preventable cause of disease, chest physicians must get involved.

86–0979. Myddelton, G. **Tobacco and Mortality. (Letter).** *Lancet* 2(8469-8470):1430, December 1985.

The argument that smoking is no longer a health controversy but a political issue uses purely statistical evidence and is not against tobacco, but against cigarette smoking. A comprehensive prospective survey and followup of some 819,672 person-years showed that (1) death rates for nonsmokers, pipe smokers, and cigar smokers are virtually identical; (2) a strong association exists between precocious cigarette smoking and an increase in death rate 30 to 60 years later; and (3) early and late starters who consumed 40 or more cigarettes/day had lower death rates than those who started smoking between the ages of 15 and 24 and smoked <10 cigarettes/day. None of the findings reconcile with the theory that smoking is the cause of death. Any lethal chemical in tobacco smoke would manifest its effects in all forms of smoking and would always be related to quantity smoked. Among women, only 20 percent of lung cancer mortality can be associated with smoking. The increase in lung cancer over the past 50 to 60 years has coincided not with smoking but with urbanization and atmospheric pollution by motor exhaust fumes (particularly the diesel engine). The true cause of the lung cancer pandemic has not yet been identified and an urgent program of research and statistical investigation is imperative.

86–0980. Participants of the Fourth Scarborough Conference on Preventive Medicine. **Is There a Future for Lower-Tar-Yield Cigarettes?** *Lancet* 2(8464):1111-1114, November 1985.

National policies encouraging reductions in cigarette tar yields are beneficial and efforts to further reduce tar yields and other smoke components should be encouraged. An international body of preventive medicine experts cautioned, however, that policies should be monitored to ensure that the concentration of smoke components (or their metabolites) in smokers declines with declining yields. The public should be made aware of any uncertainties of the policy with respect to its effects on the risk of diseases other than lung cancer, and that benefits of smoking lower-yield cigarettes are smaller than those derived from avoiding cigarettes altogether. Arguments against advocating further reductions in cigarette yield are that (1) smoking might be encouraged; (2) cigarette engineering might possibly increase the risk of disease; and (3) tar tables might mislead smokers. Arguments for continuing and encouraging national policies to reduce tar yields are that (1) the lower-tar approach may be applied to reducing yields of other noxious agents; (2) biochemical epidemiological monitoring can be implemented; (3) compensatory smoking may be investigated; and (4) awareness of possible dangers of compensatory smoking may be increased. It is concluded that the lower-yield approach is only one strategy aimed at reducing smoking-related diseases in a society where some people will continue to smoke regardless of the adverse health effects. (Auth. Abs. Mod.)

86–0981. Rothman, K.J. **Tobacco Habits.** *American Journal of Public Health* 76(2):133, February 1986.

During the last century, tobacco was generally chewed, until public spitting became a public health menace. With cheap manufacturing methods, cigarettes changed tobacco use. Today, smokeless tobacco is again gaining popularity, but among the Nation's youth. Tobacco companies, ever resourceful, have engaged a few sports heroes to pitch smokeless tobacco in addition to baseballs. As a result, adolescent use of smokeless tobacco is compensating in part for a decline in smoking. However, the public health community is confronting the new challenge: the National Institutes of Health sponsored a Consensus Development Conference on Smokeless Tobacco and a Surgeon General's report on the subject is scheduled for later this year. At least one State has already mandated warning labels on smokeless tobacco products. But whatever steps are taken, it appears unlikely that tobacco can be weeded out of our culture without more profound societal changes.

86–0982. Shusterman, D. **Criticism of Mathematical Approach to Compensatory Issue. (Letter).** *Journal of Occupational Medicine* 27(12):861-862, December 1985.

The mathematical approach to compensating asbestos-exposed workers (*Journal of Occupational Medicine* 27:189-198, March 1985) bears closer scrutiny. If affirming the causal role of smoking is interpreted as detracting from the causal role of asbestos exposure, then a misrepresentation is being created. The relative risk of cancer as a consequence of a given history of asbestos exposure is the same regardless of whether or not the worker was a smoker, since the risks of smoking and asbestos exposure are multiplicative. Although the stakes are higher in smokers who are exposed to asbestos, relative risk of lung cancer does not change with smoking status. It was suggested that an asbestos-exposed worker who quit smoking following the 1964 Surgeon General's original warning about the dangers of smoking and still contracted lung cancer should be entitled to a relatively larger degree of compensation than if he had continued to smoke. While there is no question that the asbestos industry is subjected to increased liability owing to baseline prevalence of smoking in its workforce, whether this increase should be borne by workers who smoke, the asbestos industry, or the tobacco industry is a valid question in social ethics, and an attempt to circumvent the question through mathematical abstraction is not a sufficiently straightforward answer. See also 85-1015.

86–0983. Smith, A. **Taking Money From the Devil. (Letter).** *British Medical Journal* 292(6513):135, January 11, 1986.

An earlier report (*British Medical Journal* 291(6511):1743-1744, December 21, 1985) on the role of the Health Promotion Research Trust is supported, noting that in seeking collaboration with medical researchers, the trust hopes to make respectable the sale of one of the most dangerous drugs in general use. The possibility that the trust is part of an agreement with government on restriction of tobacco advertising and the use of health warnings makes it doubly necessary to warn against accepting research funding from this source. As an example to its members and fellows, the Faculty of Community Medicine has resolved not to seek or accept money from the Health Promotion Trust. See also 86-0966.

86–0984. South African Medical Journal. **Suid-Afrikaanse Mediese Navorsingsraad: Verklaring oor Rook en Gesondheid. [South African Media Research Council: A Statement About Smoking and Health.]** *South African Medical Journal* 67(18):737-738, May 4, 1985, Afrikaans.

A report by the South African Media Research Council concerning the association between smoking and tendency toward chronic bronchitis, emphysema, lung cancer, and heart disease is presented with information on groups of smokers at high risk of disease. Studies have demonstrated that (1) smoking is strongly related to development of lung cancer and symptoms of cough, increased mucus production, and shortness of breath; (2) smoking, combined with hypertension and hypercholesterolemia, is a significant contributor to heart disease; and (3) smoking during pregnancy is associated with increased risk of perinatal mortality, spontaneous miscarriages, abnormal fetal breathing, and decreased birth weights. The antismoking program proposed would (1) ban smoking in all public places; (2) publicize the adverse effects of smoking through advertisements and use of popular personalities, with emphasis in schools and in the armed forces; (3) initiate and enforce strong restrictions on advertising and promotion of cigarettes; (4) subsidize tobacco farmers (with higher tobacco taxes) not to grow tobacco; and (5) enclose an insert in cigarette packages with a special warning to those at increased disease risk.

86–0985. Waugh, D. **Smoking: It's Time We Stopped Moralizing About a Health Issue.** *Canadian Medical Association Journal* 133(8):798-799, October 1985.

Moral force has been singularly unsuccessful in dealing with alcoholism or sexually transmitted diseases, and it is unlikely to achieve much with addictive smokers. It is important to distinguish between the addictive and the nonaddictive smoker. Nonaddictive smokers, for whom smoking is a polite social custom (a habit or fad that is practiced according to dictates of fashion), are the smokers who are susceptible to the blandishments of moralists. Most nonaddictive smokers have already quit. Residual smokers include a high proportion of addictive (dependent) smokers for whom withdrawal can lead to cardiovascular abnormalities, digestive upset, headaches, respiratory distress, sleep disorders, numbness, dizziness, hallucinations, and even prolonged and crippling mental illness. Moral pressure is unlikely to be helpful to anyone afflicted with these symptoms, and may be harmful. More compassionate understanding of the addict's problems is needed, as is research into the fundamental biology of nicotine addiction and an understanding of its mechanisms. Smokers are a tortured and largely silent minority who will benefit far more from rational therapy than from being cast out as lepers. It is time to accept smoking as a health issue and not a moral one. (Auth. Abs. Mod.)

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All items appearing in the *Smoking and Health Bulletin* become part of the permanent document collection of the Technical Information Center (TIC) of the Office on Smoking and Health and can be referred to by their accession numbers.

In the past, at the end of each calendar year, it has been customary to publish the *Bibliography on Smoking and Health*, which contained a cumulative author and subject index based on the individual *Bulletins* issued that year. This year, however, it may not be possible to issue the index in the form of the annual *Bibliography*. All readers are therefore advised to retain the individual *Bulletin* issues for calendar year 1986 until further notice.

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ISSN: 0081-0363

JULY - AUGUST 1986
Abstracts 86-0986 - 86-1312

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86–0986. Bache, C.A.; Lisk, D.J.; Doss, G.J., et al. **Cadmium and Nickel in Mainstream Particles of Cigarettes Containing Tobacco Grown on a Low-Cadmium Soil-Sludge Mixture.** *Journal of Toxicology and Environmental Health* 16(3/4):547-552, 1985.

Cadmium levels were significantly higher ($p<0.001$) in mainstream smoke of cigarettes made from tobacco grown on soil to which municipal sludge had been added than in smoke from cigarettes constructed from soil-grown tobacco (control). Cigarettes were smoked by machine and the mainstream particulate fraction was analyzed for total cadmium and nickel content. Sludge-grown and soil-grown tobaccos contained, respectively, 5.33 and 1.87 ppm cadmium and 1.15 and 0.64 ppm nickel. Average quantities of cadmium and nickel (ng/cigarette) found in mainstream particulate fractions were 220.5 and 78.5 for sludge-grown and 147.4 and 72.6 for soil-grown. The difference between treatments was not significant for nickel. Although the quantity of cadmium in mainstream particulates of sludge-grown tobacco was higher than in controls, it was within the range of that of commercial cigarettes. In comparison with the mobility of cadmium in soils and its uptake by plants, many other toxic heavy metals commonly found in sludges (e.g., lead, chromium, mercury, and arsenic) undergo rapid fixation in soils and are thus largely unavailable for plant absorption. (Auth. Abs. Mod.)

86–0987. Borland, C.D.R.; Chamberlain, A.T.; Higenbottam, T.W., et al. **A Comparison Between the Rate of Reaction of Nitric Oxide in the Gas Phase and in Whole Cigarette Smoke.** *Beitrage zur Tabakforschung International* 13(2):67-73, December 1985.

Nitric oxide (NO) in the gas phase of cigarette smoke oxidizes at a faster than predicted rate, suggesting a catalytic oxidation process by free radicals in the absence of particulates. Utilizing a single-port smoking machine and a chemiluminescence NO analyser, it was found that, over a 10-minute period, disappearance of NO in whole smoke conformed to a linear decay (i.e., (pseudo) second order kinetics observed for oxidation of NO in air). In the gas phase, however, the disappearance rate was more rapid and appeared to follow a logarithmic decay (i.e., first order kinetics). This higher reaction rate for gas phase can result from accelerated oxidation by free radicals available from the burning process and indirectly from decomposition of peroxy nitrates. The gas-to-whole-smoke rate differences suggest that particulate matter "quenches" highly active oxygen-containing species. Since these species are alleged to be toxic, experiments in which animals, enzymes, and cell suspensions are exposed to isolated gas phase may yield results not applicable to whole smoke. Similarly, unless conditions exist in the respiratory tract where separation of gas phase and particulates occurs, oxygen-centered free radicals may not reach levels sufficient to cause toxicity. (Auth. Abs. Mod.)

86–0988. Church, D.F.; Pryor, W.A. **Free-Radical Chemistry of Cigarette Smoke and Its Toxicological Implications.** *Environmental Health Perspectives* 64:111-126, December 1985.

Cigarette smoke contains two very different populations of free radicals, one in tar and one in the gas phase. Tar contains several relatively stable free radicals, and quinone/hydroquinone (Q/QH_2) complex held in tarry complex has been identified as the principal radical. It is suggested that the Q/QH_2 polymer is an active redox system capable of reducing molecular oxygen to produce superoxide, eventually leading to hydrogen peroxide and hydroxyl radicals. In addition, it is shown that the principal radical in tar reacts with DNA in vitro, possibly by covalent binding. The gas phase of cigarette smoke contains small oxygen- and carbon-centered radicals that are much more reactive than tar-phase radicals. The gas-phase radicals, which do not arise in flame, are produced in a steady state by oxidation of nitric oxide (NO) to nitrogen dioxide (NO_2), which then reacts with reactive species in smoke such as isoprene. It is suggested that these radicals and the metastable products derived from these radical reactions may be responsible for inactivation of α_1-proteinase inhibitor by fresh smoke. Cigarette smoke oxidizes thiols to disulfites. It is suggested that the active oxidants are NO and NO_2. The complex effects of smoke on lipid peroxidation are discussed, as are the toxicological implications of radicals in smoke, in terms of a number of radical-mediated disease processes, including emphysema and cancer. (Auth. Abs. Mod.)

86–0989. Jenkins, R.W., Jr.; Goldey, C.; Williamson, T.G. **Neutron Activation Analysis in Tobacco and Cigarette Smoke Studies: 2R1 Cigarette Composition, Smoke Transference and Butt Filtration.** *Beitraege zur Tabakforschung International* 13(2):59-65, December 1985.

Neutron activation analyses were used to determine some of the inorganic components of the complete 2R1 reference cigarette, the tobacco filter, cigarette paper, dropped ash, and mainstream particulate smoke. Transference values are presented for sodium (Na), potassium (K), bromine (Br), chlorine (Cl), cobalt (Co), rubidium (Rb), aluminum (Al), scandium (Sc), and manganese (Mn). Neutron activation analysis was also used to determine butt filtration of selected inorganics in the tobacco rod and in cellulose acetate filters. Na, K, Br, and Cl appeared to be removed by normal filtration mechanisms (direct impaction, interception, or diffusion) of entrained particles of inorganic residue coming from the cigarette coal. Vapor condensation of inorganics was not considered a major filtration mechanism because uniform filtration was observed at distances far enough behind the coal that the smoke would have been at room temperature, with essentially all condensation completed. Calcium and magnesium were removed in a manner that indicated a removal mechanism dependent on very large particles enriched in these elements. A proposed mechanism is given to account for the lack of any detectable transference of the elements to mainstream smoke. (Auth. Abs. Mod.)

86–0990. Malik, S.K.; Behera, D. **Chemistry of Tobacco and Tobacco Smoke in Chutta—A Homemade Cigar: A Preliminary Study.** *International Journal of Clinical Pharmacology, Therapy and Toxicology* 23(11):604-605, November 1985.

The tobacco content of chuttas was analyzed for the percentage of reducing sugars, nicotine alkaloids, chloride, and total nitrogen. Chutta smoke was also analyzed using the following smoking parameters: puff duration, 2 sec; puff frequency, 1 min; puff volume, 35 mL; and butt length, 23 mm. The percentage of nicotine, reducing sugars, chloride, and total nitrogen in chutta tobacco was 1.4, 1.1, 1.3, and 2.95, respectively. Smoke analysis revealed high nicotine content and high total particulate matter compared with standard unfiltered Indian cigarettes and bidis. Duplicate pH values of chutta smoke ranged between 7.6 and 7.8, and temperature recordings during quiet burning, normal puffing, and maximum puffing were 240, 300, and 360° C, respectively. The health effects of smoking chuttas in the normal and reverse manners are discussed in relation to the results.

86–0991. Schenker, D. **Betrachtungen zum Cadmiumgehalt von Tabakerzeugnissen. [Considerations on the Cadmium Content of Tobacco Products.]** *Forum Staedte-Hygiene* 35(1):17-18, January-February 1984, German.

Cadmium content of tobacco, cigarettes, food, and air and human intake from these sources is discussed. Tobacco plants have a special ability to remove cadmium from the soil and concentrate it in leaves. Cadmium levels in tobacco range from 0.77 to 7.02 μg/g, levels in food plants are ≤0.05 μg/g, and levels in cigarettes range from 0.8 to 3.67 μg/g. When a filter cigarette with a cadmium content of 0.82 μg is smoked, distribution is 0.13 μg (15.9 percent) in the ash, 0.12 μg (14.6 percent) in the butt, 0.14 μg (17 percent) in smoke inhaled by the smoker, and 0.43 μg (52.4 percent) in smoke that develops at the burning end of the cigarette. Weekly cadmium intake from food (including water), air (with a respiratory volume of 20 m^3/day), and smoking (40 cigarettes/day) is demonstrated. Of 284 μg cadmium ingested in food, 6 percent is resorbed; of 25 percent of cadmium in inhaled air and 50 percent of cadmium in cigarette smoke that is deposited in the lungs, 70 percent is resorbed. Smoking 40 cigarettes/day provides twice as much cadmium as food. Cadmium intake from air is insignificant.

86–0992. Schlotzhauer, W.S.; Arrendale, R.F.; Chortyk, O.T. **The Rapid Pyrolytic Characterization of Tobacco Leaf Carbohydrate Material.** *Beitrage zur Tabakforschung International* 13(2):74-80, December 1985.

An improved, rapid, semimicropyrolysis technique for determining the role of major tobacco leaf constituents in formation of smoke compounds affecting overall flavor, aroma, and biological properties is described. The method, in combination with gas chromatography (GC-2) and mass spectrometry, identifies semivolatile compounds arising from thermal degradation of sugar (sucrose) and polysaccharides (cellulose and dextrin). Utility and validity of the semimicropyrolysis/GC-2 method applied to materials representative of tobacco cell wall constituents and sucrose are described. Cellulose and dextrin produced a pattern of furan and cyclic ketones of potential importance to flavor and aroma of tobacco smoke. Sucrose pyrolysis resulted in formation of substantial amounts of 2-furaldehyde and lesser quantities of substituted furans. Cell-wall biopolymer lignin was a source of phenols, but contributed little to the compounds produced in the thermal breakdown of carbohydrates. (Auth. Abs. Mod.)

86–0993. Yamamoto, T.; Suga, Y.; Tokura, C., et al. **Effect of Cigarette Circumference on Formation Rates of Various Components in Mainstream Smoke.** *Beitrage zur Tabakforschung International* 13(2):81-87, December 1985.

The effect of circumference on rate of formation (ratio of total delivery to weight loss of tobacco during puffs) of various components was investigated, using cigarettes of constant packing density with circumferences of from 21 to 26 mm. Carbon monoxide (CO) formation rates increased slightly, hydrogen cyanide (HCN) increased considerably, and benzo(*a*)pyrene (BaP) decreased with decreasing circumference. Carbon dioxide, nitric oxide, and vapor phase acetaldehyde formation rates and tar were almost constant and independent of cigarette circumference. The increase in the rate of formation of CO and HCN is the result of an increase in combustion temperature owing to a decreased circumference. A relationship also exists between the BaP rate of formation and combustion temperature. The reason for differences in the effect of circumference between the amounts of BaP and HCN in mainstream smoke can be ascribed to distinction in formation rates during puffs and retention by the filter. Increase and acceleration in BaP with circumference in mainstream smoke can be explained by an increase in the rate of formation that results in a sharp increase in total delivery. Near constant amounts of HCN in mainstream smoke are the result of a sharp decrease in retention by the filter and an increase in HCN formation rate with decreasing circumference. (Auth. Abs. Mod.)

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86–0994. Andersson, K.; Eneroth, P.; Fuxe, K., et al. **Effects of Chronic Exposure to Cigarette Smoke on Amine Levels and Turnover in Various Hypothalamic Catecholamine Nerve Terminal Systems and on the Secretion of Pituitary Hormones in the Male Rat.** *Neuroendocrinology* 41(6):462-466, December 1985.

Development of tolerance to effects of chronic cigarette smoke exposure on various hypothalamic catecholamine (CA) nerve terminal systems and on neuroendocrine function were investigated in male rats. Exposure to unfiltered smoke resulted in a 10 percent increase in CA levels within the lateral palisade zone, the posterior periventricular hypothalamic nucleus, and the dorsomedial hypothalamic nucleus. There was also an increase in amine turnover in the dopamine (DA) systems of the medial and lateral palisade zones and in the periventricular noradrenaline (NA) hypothalamic systems. Chronic exposure to unfiltered smoke also resulted in reduced levels of prolactin, luteinizing hormone (LH), and follicle-stimulating hormone (FSH). It is suggested that the effects on neuroendocrine function and on hypothalamic CA systems are mediated via nicotine. Data indicate that tolerance does not develop with regard to the inhibitory effects of smoke exposure on prolactin, LH, and FSH secretions or the stimulatory effects on the tubero-infundibular DA neurons and the periventricular NA systems. Chronic smoke exposure did appear to induce tolerance with regard to its stimulatory effects on subependymal, dorsomedial, and paraventricular hypothalamic NA systems and on corticosterone release. (Auth. Abs. Mod.)

86–0995. Bonde, J.; Pedersen, L.E.; Bodtker, S., et al. **The Influence of Age and Smoking on the Elimination of Disopyramide.** *British Journal of Clinical Pharmacology* 20(5):453-458, November 1985.

The influence of smoking and age on kinetics of disopyramide, a drug often used in elderly patients with arrhythmias of both supraventricular and ventricular origin, was studied in 27 patients. Total elimination clearance was significantly ($p<0.05$) decreased in elderly nonsmokers compared with young nonsmokers. Smoking more than 20 cigarettes/day significantly ($p<0.05$) increased total elimination clearance in elderly patients, but no significant effect was observed in young healthy persons. Serum concentrations of α_1-acid glycoprotein, the major binding protein of disopyramide, were significantly higher ($p<0.001$) in the elderly, but so was volume of distribution ($p<0.001$). Steady-state serum concentrations of the free drug were significantly ($p<0.01$) lower in young volunteers (0.75 ± 0.13 µg/mL) than in the elderly (0.90 ± 0.10 µg/mL). Half-life of disopyramide was significantly shorter ($p<0.01$) in young volunteers. No difference was observed in the relationship between serum concentration of disopyramide and its main dealkylated metabolite. A reduction of disopyramide dosage by approximately 30 percent in elderly nonsmokers is recommended. (Auth. Abs. Mod.)

86–0996. Borish, E.T.; Cosgrove, J.P.; Church, D.F., et al. **Cigarette Tar Causes Single-Strand Breaks in DNA.** *Biochemical and Biophysical Research Communications* 133(2):780-786, December 17, 1985.

Cigarette tar causes single-strand breaks in DNA, according to electrophoresis results of DNA treated with tar. In vitro incubation of phage PM2 DNA with aqueous extracts of cigarette tar introduced DNA single-strand breaks. Effects of protective enzymes and radical scavengers appeared to involve active oxygen species. Although the semiquinone components of tar reduce dioxygen-forming superoxide radicals and hydrogen peroxide, results suggest that hydroxyl radicals formed by means of metal-catalyzed decomposition of hydrogen peroxide are ultimately responsible for DNA lesions. Metals in tar appear to be reduced by semiquinone components of tar and by superoxide at comparable rates. (Auth. Abs. Mod.)

86–0997. Crebelli, R.; Aquilina, G.; Falcone, E., et al. **Monitoring of Urinary Mutagenicity in Workers Exposed to Low Doses of 2,4,7-Trinitro-9-Fluorenone.** *Scandinavian Journal of Work, Environment and Health* 11(4):295-300, August 1985.

Occupational exposure to low levels of 2,4,7-trinitro-9-fluorenone (TNF) may be overlooked in urinary mutagenicity monitoring. Urine concentrate of 22 exposed workers (11 smokers and 11 nonsmokers) and 18 presumably unexposed workers (7 smokers and 11 nonsmokers) were assayed for mutagenicity in *Salmonella typhimurium* strain TA98 with the plate incorporation technique. In this test system, none of the urine concentrate was effective as a mutagen, either in the absence or presence of rat liver microsomal fractions (S9). Urine samples from eight exposed workers and seven referents were also tested in the microtiter fluctuation assay. Smoking habits were significantly related to urinary mutagencicity in tests performed with metabolic activation. However, the association between presumed exposure and urinary mutagenicity was not significant in either test. Results were evaluated from data obtained from rats exposed to TNF by different routes. It was observed that urinary mutagenicity accounts for a minor fraction of administered TNF dose (about 0.1 to 0.2 percent, depending on the route of exposure); thus, low-level exposure to TNF could escape detection by urinary mutagencity monitoring. (Auth. Abs. Mod.)

86–0998. Daenens, P.; Laruelle, L.; Callewaert, K., et al. **Determination of Cotinine in Biological Fluids by Capillary**

Gas Chromatography—Mass Spectrometry—Selected-Ion Monitoring. *Journal of Chromatography* 342(1):79-87, July 12, 1985.

A sensitive and selective method for determination of cotinine in plasma and urine is presented. Quantitation is effected by capillary gas chromatography—mass spectrometry after liquid—liquid extraction of 0.25 to 1.00 mL of biological specimens with a trideuterated cotinine internal standard. The procedure is linear and has acceptable precision over the range of concentrations encountered in pharmacokinetic studies of nicotine or cotinine. The precision and accuracy of the assay was tested in a 3-day validation study in which 9 or 10 plasma samples from a plasma pool containing 85 ng/mL cotinine were analyzed each day. Assay sensitivity and specificity were tested with human clinical samples following administration of nicotine or cotinine at varying time—dose rates. The resulting plasma concentration—time curves demonstrate the suitability of the assay after a single oral or intravenous administration of cotinine and after multiple-dose intravenous administration of nicotine. (Auth. Abs. Mod.)

86–0999. Das, I. **Raised C-Reactive Protein Levels in Serum From Smokers.** *Clinica Chimica Acta* 153(1):9-13, November 1985.

Smokers had significantly higher serum C-reactive protein (CRP) levels and significantly lower serum albumin levels than nonsmokers in an investigation of the relationship between extent of tissue injury resulting from smoking and changes in concentrations of a number of acute-phase proteins. Although the test is nonspecific, evidence for elevated levels of CRP indicates tissue inflammation. No significant smoking-related changes occurred in serum levels of α_1-antitrypsin, α_1-antichymotrypsin, α_1-acid glycoprotein, transferrin, and haptoglobin. Blood samples were obtained from 96 volunteers aged 20 to 40 years: 64 smokers (90 percent, >20 cigarettes/day; 10 percent, 10 to 20 cigarettes/day) and 32 nonsmokers. CRP increases have been associated with infection, liver damage, and myocardial infarction. Acute phase response in chronic smokers provides additional evidence of significant tissue inflammation associated with smoking, and may prove to be a more accurate index of tissue injury. (Auth. Abs. Mod.)

86–1000. El-Sayed, H.; Matulionis, D.H. **Pulmonary Macrophage Mobilization in Cigarette Smoke-Exposed Mice After Halothane Anesthesia.** *Anesthesia and Analgesia* 65(1):37-45, January 1986.

Ciliary function was impaired and phagocytes were mobilized from alveoli into the airways of smoke-exposed C57BL/6 mice subjected to halothane anesthesia. In an investigation of the effects of inhalational anesthesia (halothane) on morphologic pulmonary abnormalities and on lung macrophage system response in smoke-exposed and normal animals, no lung abnormalities could be attributed solely to halothane anesthesia. The airways cilia of animals exposed to smoke and subsequently to anesthesia were shorter and fewer in number. Disorientation of ciliary basal bodies was also observed. Airway macrophages in smoke-exposed animals subjected to anesthesia were generally larger in size and contained more lysosomes and inclusions than phagocytes in airways of all other animals. Smoke inhalation alone caused a significant increase in number of lung parenchymal macrophages compared with cell number in sham-treated and control animals. Airway macrophage numbers were significantly elevated in smoke-exposed mice 48 hours after halothane compared with those of all other groups. Conversely, a decreased number of parenchymal macrophages was found in lungs of these mice. (Auth. Abs. Mod.)

86–1001. Everson, R.B.; Randerath, E.; Santella, R.M., et al. **Detection of Smoking-Related Covalent DNA Adducts in Human Placenta.** *Science* 231(4733):54-57, January 3, 1986.

Presence of covalent DNA chemical addition products (adducts) in human term placentas was investigated by recently developed immunologic and ^{32}P-postlabeling assays. DNA from placental specimens of smokers showed a small but not statistically significant increase in adduct levels when tested by antibodies to DNA modified with a benzo(*a*)pyrene dihydrodiol epoxide (BPDE-I), the ultimate carcinogenic derivative of benzo(*a*)pyrene. The postlabeling assay detected several modified nucleotides, one of which (adduct 1) strongly related to maternal smoking during pregnancy. This adduct was present in placental tissue from 16 of 17 smokers, but only 3 of 14 nonsmokers. Among smokers, levels of adduct 1 in general were only weakly related to questionnaire and biochemical measures of intensity of smoking exposures, suggesting modulation by individual susceptibility factors. The adduct seemed to be derived from an aromatic carcinogen, but it may not result from several of the most intensely studied polycyclic aromatic hydrocarbons or aromatic amines in tobacco smoke. Data show the association of cigarette smoking with covalent damage to human DNA in vivo.

86–1002. Fitzgerald, R.E.; Oettinger, R.; Battig, K. **Reduction of Nicotine-Induced Hyperactivity by pCPA.** *Pharmacology Biochemistry and Behavior* 23(2):279-284, August 1985.

Nicotine effects on locomotor activity and exploration behavior were studied in female Wistar rats, utilizing an automated tunnel maze consisting of a central arena and six radially symmetrical angled arms. Total arm visit frequency was significantly increased in nicotine-treated rats (0.2 mg/kg s.c., 20 to 30 minutes pretest) compared with saline-treated rats on each of 5 test days ($p<0.001$). However, the number of visits made to the arm ends was not significantly higher in the nicotine-treated group. Within-session habituation and efficiency of arm patrolling were not significantly affected by nicotine treatment. Treatment with parachlorophenylalanine (pCPA, 300 mg/kg i.p., 3 days pretest) reduced arm visit frequency in nicotine-treated but not saline-treated rats; pCPA had no effect on intrasession habituation or number of repetitions in either treatment group. Treatment with 5-hydroxytryptophan (50 mg/kg i.p., 90 minutes pretest) reduced arm entry frequency in saline-, nicotine-, and pCPA-treated groups. Results indicate that nicotine stimulates spontaneous locomotor activity without affecting exploratory efficiency. Serotonergic systems appear to participate in this stimulant effect, but their location and function remain to be determined. (Auth. Abs. Mod.)

86–1003. Fuxe, K.; Siegel, R.A.; Andersson, K., et al. **Acute Continuous Exposure to Cigarette Smoke Produces Discrete Changes in Cholecystokinin and Substance P Levels in the Hypothalamus and Preoptic Area of the Male Rat.** *Acta Physiologica Scandinavica* 125(3):437-443, November 1985.

The effects of acute continuous exposure to cigarette smoke on neuroendocrine function of male rats were investigated. By means of a Walton Horizontal Smoking Machine, rats were exposed to smoke from between 1 and 4 unfiltered Kentucky reference cigarettes burned in a continuous fashion. Acute smoke exposure induced increases in cholecystokinin (CCK) levels in the paraventricular hypothalamic region and decreases in CCK levels in the median eminence. Smoke exposure also resulted in decreased CCK and substance P levels in the medial preoptic region. Results suggest that these neuropeptides may be involved in some of the neuroendocrine effects of unfiltered cigarette smoke and that CCK and substance P-containing neuronal systems can be regulated by cholinergic nicotine-like receptors. (Auth. Abs. Mod.)

86–1004. Gillespie, M.N.; Owasoyo, J.O.; Kiritsy-Roy, J.A., et al. **Exaggerated Nicotine-Induced Norepinephrine Release From Atherosclerotic Rabbit Hearts.** *Toxicology* 37(1-2):147-157, October 1985.

Nicotine-induced increases in norepinephrine concentration in coronary effluent from rabbits were greater in atherosclerotic hearts than in normal hearts. Excessive cigarette smoking is known to act synergistically with atheromatous coronary artery disease to greatly enhance risk of acute myocardial infarction. To explore the possible mechanism of this relation, adult male rabbits were rendered atherosclerotic by a standard laboratory diet enriched with 2 percent cholesterol. After 12 to 13 weeks, hearts were excised and retroperfused according to the Langendorff technique. There were no differences between control and atherosclerotic animals in terms of baseline (—)-norepinephrine concentration in coronary effluent. However, increases in (—)-norepinephrine concentration provoked by 10 μg and 30 μg nicotine were significantly greater in atherosclerotic hearts than in normal hearts. Similarly, myocardial tissue from atherosclerotic animals contained significantly more (—)-norepinephrine than controls. Diet-induced atherosclerosis in rabbits was associated with an increase in myocardial (—)-norepinephrine content, and it was concluded that increased (—)-norepinephrine stores can be mobilized by nicotine. (Auth. Abs. Mod.)

86–1005. Gothoni, P.; Ikola, W. **Ethanol Withdrawal Tremor Potentiates the Tremorogenic Action of Nicotine.** *Medical Biology* 63(3):131-136, 1985.

Results suggest that (1) nicotine-induced tremor is due to a cumulative dose effect, (2) the tremor is mainly of central nervous system origin, and (3) peripheral mechanisms mediate only the fast frequency component (15 Hz). The tremorogenic effect of nicotine was studied in control rats and in rats withdrawn for 16 to 48 hours from 6 to 9 days of ethanol administration. A single dose of nicotine (5 mg/kg, subcutaneous) produced 2- to 30-minute convulsions within 1 minute after injection. Five repeated injections of nicotine (5 mg/kg s.c.) at half-hour intervals produced tremor that encompassed peak frequencies of 6, 10, and 15 Hz. Hexomethonium at 10 mg/kg did not inhibit tremor, but eliminated the highest peak frequency and tended to increase the intensity. Propranolol at 5 mg/kg completely abolished nicotine-induced tremors. Rats in the ethanol withdrawal group showed a marked hypersensitivity to the tremorogenic action of nicotine; a single dose of 1 mg/kg nicotine induced tremor at peak frequencies of 6, 10, and 12 Hz. Hexamethonium did not change these frequencies and tended to increase the intensity of nicotine-induced tremor. Propranolol did not inhibit the tremor but did eliminate the 12 Hz peak frequency. (Auth. Abs. Mod.)

86–1006. Haley, N.J.; Hoffmann, D. **Analysis for Nicotine and Cotinine in Hair to Determine Cigarette Smoker Status.** *Clinical Chemistry* 31(10):1598-1600, October 1985.

Nicotine and cotinine concentrations in scalp hair samples of smokers and nonsmokers correlated with individual smoking habit and exposures, and may prove to be a reliable noninvasive validation of cigarette smoking behavior. Concentrations of nicotine averaged 15.8 and 2.42 μg/g in smokers and nonsmokers, respectively, while concentrations of cotinine averaged 0.5 μg/g in smokers and was undetectable in 8 of 10 nonsmokers. Hexane washings removed small percentages of nicotine and even smaller amounts of cotinine from hair samples of smokers, while about a third of nicotine in hair samples of nonsmokers was removed and cotinine was not detected at all. Results indicate that nicotine from environmental exposure to tobacco smoke can be removed by hexane washings, but nicotine and cotinine within the hair shaft are not removed and must be extracted for analysis by stronger solvents (differentiating environmental and behavioral sources of nicotine). This detection method is applicable to large population studies, particularly adolescents, where peer pressure can compromise self-reporting of smoking habit.

86–1007. Hansen, J.C.; Wulf, H.C.; Kromann, N., et al. **Cadmium Concentrations in Blood Samples From an East Greenlandic Population.** *Danish Medical Bulletin* 32(5):277-279, October 1985.

Blood cadmium concentrations were higher in smokers (2.2 μg/L) than in nonsmokers (1.1 μg/L) in 101 samples from natives of the district of Angmagssalik, East Greenland, and 29 samples from East Greenlanders living temporarily in Copenhagen. Ethnic origin, sex, age, and amount of seals or other marine mammals eaten were also considered as variables. Differences between smokers and nonsmokers were highly significant ($p < 0.001$) in both the groups, but no relationship was found between the number of cigarettes smoked/day and concentrations of blood cadmium. Thus, the group smoking from 1 to 9 cigarettes/day had an arithmetic mean of 2.3 and 2.4 μg/L for men and women, respectively, while the group smoking >20 cigarettes/day had means of 2.4 and 2.5 μg/L, respectively, compared with a mean of 1.1 μg/L for nonsmokers (men and women). The lack of a relationship may have been the result of inaccurate answers to question regarding smoking habits. In the control group of Greenlanders living in Copenhagen, similar results were found (mean 0.9 μg/L in nonsmokers and 1.95 μg/L in smokers). (Auth. Abs. Mod.)

86–1008. Husum, B.; Valentin, N.; Wulf, H.C., et al. **Sister Chromatid Exchanges in Cigarette Smokers: Effects of Halothane, Isoflurane or Subarachnoid Blockade.** *British Journal of Anaesthesia* 57(11):1100-1103, November 1985.

Sister chromatid exchange (SCE) rate in lymphocytes of cigarette smokers remained unchanged after general anesthesia and subarachnoid analgesia, with no indication of mutagenic action of halothane or isoflurane, in nitrous oxide. An earlier study of potential mutagenic action of isoflurane using the SCE test in lymphocytes of surgical patients showed that SCE increased in 11 cigarette smokers with no effect in nonsmokers. No significant changes were observed in 63 cigarette smokers (10 to 30 cigarettes/day) examined by SCE test before and after minor orthopedic operations under halothane or isoflurane anesthesia or subarachnoid analgesia. The risk of having missed a "true" increase of >0.6 SCE/cell was < 1 percent. Patients (23 women and 40 men aged 18 to 64 years) were all healthy and on no medication. Patients were asked to refrain from smoking for 36 hours, starting at midnight before the operation. (Auth. Abs. Mod.)

86–1009. Kasson, B.G.; Hsueh, A.J.W. **Nicotinic Cholinergic Agonists Inhibit Androgen Biosynthesis by Cultured Rat Testicular Cells.** *Endocrinology* 117(5):1874-1880, November 1985.

The actions of nicotine and other cholinergic agents on androgen production by Leydig cells were investigated using a primary culture of testicular cells derived from adult hypophysectomized rats. Treatment with human chorionic gonadotropin (hCG) increased testosterone production fiftyfold over control values, but concomitant treatment with nicotinic cholinergic agonists (lobeline, nicotine, and dimethylphenylpiperazinium iodide) inhibited hCG-stimulated androgen biosynthesis in a dose-dependent fashion, with IC_{50} values of 3×10^{-5}, 1.7×10^{-4}, and $>10^{-3}$ mol, respectively. Treatment with cholinergic agents alone failed to increase androgen production. Muscarine and bethanecol, two muscarinic cholinergic agonists, failed to inhibit androgen production at concentrations of up to 10^{-3} mol. These results and further experiments indicate that nicotinic, but not muscarinic, cholinergic agonists inhibit androgen biosynthesis through selective inhibition of 17α-hydroxylase activity. The demonstrated inhibitory action of nicotinic cholinergic agents on testicular steroidogenesis suggests an inhibitory role for endogenous acetylcholine. (Auth. Abs. Mod.)

86–1010. Kizawa, Y.; Takayanagi, I. **Possible Involvement of Substance P Immunoreactive Nerves in the Mediation of Nicotine-Induced Contractile Responses in Isolated Guinea Pig Bronchus.** *European Journal of Pharmacology* 113(3):319-323, July 31, 1985.

The mechanism of action of nicotine on guinea pig bronchial muscle and the possible involvement of substance P (SP) immunoreactive nerves in the contractile response was studied. Nicotine-induced contraction of isolated guinea pig bronchial preparations was abolished by capsaicin and the SP antagonist (D-Arg^1, D-Pro^2, D-Trp^{7,9}, Leu^{11}) SP, strongly suggesting that there is a contribution from SP-like materials released by nicotine to the contractile mechanisms. Nicotine increased release of immunoreactive SP from bronchial preparations. Degree of response was reduced by hexamethonium but not by tetradotoxin. Findings indicate that the contractile response is due to activation of the nicotinic receptor on the SP immunoreactive nerve. Response to nicotine was almost abolished by hexamethonium, but nicotine-evoked release of immunoreactive SP was reduced by only 50 percent, suggesting that nicotine might have partly evoked release of materials that assayed as immunoreactive SP and could not contract bronchial smooth muscle. Results suggest that the mechanism for nicotine-induced bronchial contraction varies between species.

86–1011. Marks, M.J.; Stitzel, J.A.; Collins, A.C. **Time Course Study of the Effects of Chronic Nicotine Infusion on Drug Response and Brain Receptors.** *Journal of Pharmacology and Experimental Therapeutics* 235(3):619-628, December 1985.

Nicotine tolerance and effects on brain receptors over time were investigated utilizing mice in Y-maze experiments and other tests accompanied by nicotine infusion (4 mg/kg/hour). Maximal tolerance was reached in 4 days and paralleled increases in brain nicotine binding sites. Chronic nicotine treatment increased binding of α-bungarotoxin, but increases preceded development of detectable tolerance to the challenge dose of nicotine. Chronic nicotine treatment had no effect on quinuclidinyl benzilate binding. Tolerance to nicotine was lost at different rates for various tests (i.e., baseline response was attained in 8 days for the Y-maze activity and rearings test, whereas 12 to 16 days were required to regain control response for body temperature). Tolerance for the heart rate test lasted throughout the 20-day withdrawal period. Brain nicotine binding sites had returned to control levels by 8 days after treatment; α-bungarotoxin binding sites were at control levels at 4 days (earliest postinfusion testing). Brain quinuclidinyl benzilate binding sites, which were unaffected by nicotine treatment, did not change during the withdrawal period. Changes in nicotine binding in various brain regions during onset and offset experiments were virtually identical. Changes in binding correlated highly with acquisition and loss of tolerance to effects of nicotine on Y-maze locomotor activity and body temperature tests. (Auth. Abs. Mod.)

86–1012. McNabb, M.E. **Nicotine Tolerance Questionnaire Scores and Plasma Nicotine: No Correlation.** *Addictive Behaviors* 10:329-332, 1985.

A simple, nonchemical method of indicating degree of nicotine tolerance, designed to be used primarily by physicians in selecting candidates for nicotine chewing gum and for determining nicotine dosage, has yet to be validated. A questionnaire proposed to estimate nicotine tolerance and to rate physical dependence of cigarette smokers was completed by 97 persons entering a smoking cessation clinic. The 58 women (mean age 44.5 years) and 39 men (mean age 45.5 years) had smoked an average of 25.1 years, and currently were smoking 35 cigarettes/day (average nicotine yield 0.78 mg). Late afternoon blood specimens were submitted for nicotine evaluation. Results showed no correlation between questionnaire scores and plasma nicotine levels. None of the questions had discriminatory value. (Auth. Abs. Mod.)

86–1013. Miners, J.O.; Attwood, J.; Wing, L.M.H., et al. **Influence of Cimetidine, Sulfinpyrazone, and Cigarette Smoking on Theobromine Metabolism in Man.** *Drug Metabolism and Disposition* 13(5):598-601, September-October 1985.

The influence of cimetidine, sulfinpyrazone, and cigarette smoking on theobromine metabolism and clearance was investigated under chronic oral dosing conditions in eight healthy volunteers (four cigarette smokers). Theobromine plasma clearance (Cl_{TB}) was 33 percent higher in smokers than in nonsmokers owing to induction of all metabolic pathways (3-demethylation, 7-demethylation, and formation of 6-amino-5-(N-methylformylamino)-1-methyluracil (AMMU)). The metabolic pathway induced to the greatest extent by cigarette smoking was 7-demethylation. Cimetidine pretreatment inhibited theobromine 3-demethylation and AMMU formation resulting in a 27 percent decrease in Cl_{TB} in the combined smoker/nonsmoker group. The 7-demethylation pathway was unaffected by cimetidine. Sulfinpyrazone pretreatment increased Cl_{TB} by 50 percent in the whole group by approximately equal induction of each metabolic pathway. The extent of induction due to sulfinpyrazone was 2.4-fold greater in nonsmokers than in smokers. Results suggest that theobromine 3-demethylation is mediated by the same forms of cytochrome P-450 involved in theophylline demethylation. Since AMMU formation was inhibited by cimetidine and induced by cigarette smoking and sulfinpyrazone, it appears that conversion of theobromine to AMMU is also mediated by cytochrome P-450. (Auth. Abs. Mod.)

86–1014. Nesje, L.A.; Mjos, O.D. **Plasma HDL Cholesterol and the Subclasses HDL_2 and HDL_3.** *Artery* 13(1):7-18, 1985.

Levels of plasma cholesterol, high density lipoprotein (HDL) cholesterol, HDL_2 cholesterol, HDL_3 cholesterol, and triglycerides in 45 healthy males aged 40 to 49 years confirmed that HDL cholesterol levels are lower in smokers than in nonsmokers. HDL, HDL_2, and HDL_3 cholesterol levels in 14 male smokers of >15 cigarettes/day for at least 10 years were all significantly lower than in 23 nonsmokers ($p<0.05$). HDL_2 cholesterol level was 30 percent lower and HDL_3 cholesterol was 17 percent lower. When heavy smokers and nonsmokers were compared, no significant difference was found for plasma triglycerides or total cholesterol. In groups that excluded high alcohol consumption and physical activity, differences between heavy smokers and nonsmokers were more pronounced than in the total group, particularly for HDL_2 cholesterol. Since HDL_2 is considered to be the antiatherogenic fraction of HDL, lower HDL_2 cholesterol in heavy smokers may be of major relevance to increased risk of coronary heart disease and other diseases related to atherosclerosis. (Auth. Abs. Mod.)

86–1015. Olson, J.W.; Crooks, P.A. **Effect of Nicotine and N′-Nitrosonornicotine on Rat Lung and Trachea Ornithine Decarboxylase Activity.** *Carcinogenesis* 6(10):1517-1519, October 1985.

The effects of a single subcutaneous administration of nicotine or N′-nitrosonornicotine (NNN), two specific components of tobacco smoke, on ornithine decarboxylase (ODC) activity in rat lung and trachea are described. Nicotine at 3.3 mg/kg significantly increased lung and trachea ODC activity (approximately thirteenfold and tenfold, respectively), but did not produce acute toxicity. However, the 7.5 mg/kg dose that consistently caused tremors and an occasional convulsion is thought to be equivalent to the 1.5 mg nicotine yield from smoking a single cigarette. NNN caused an increase in lung ODC activity 6 hours and 4 days after a single dose of either 33, 90, or 200 mg/kg, but only the 200 mg dose at 6 hours and the 90 mg dose at 4 days produced a significant increase in lung ODC activity. NNN did not produce any effect on trachea ODC activity. It is suggested that the impact of these tobacco-specific agents upon respiratory tract polyamine biosynthesis could contribute to some of the multifaceted effects associated with cigarette smoking. A procedure for synthesis of analytically pure NNN is also described.

86–1016. Pool, W.F.; Crooks, P.A. **Biotransformation of Primary Nicotine Metabolites. I. *In Vivo* Metabolism of *R*-(+)-(^{14}C-NCH$_3$)*N*-Methylnicotinium Ion in the Guinea Pig.** *Drug Metabolism and Disposition* 13(5):578-581, September-October 1985.

N-methylcotininium ion and *N*-methylnornicotinium ion are both formed subsequent to the *N*-methylnicotinium ion in metabolism of *R*-(+)-nicotine in the guinea pig, according to a study of in vivo biotransformation and tissue distribution of the metabolite. Detection and quantification of 24-hour urinary metabolites after intraperitoneal injection was performed by cation-exchange high pressure liquid chromatography interfaced to a radiochemical flowthrough detector. The urinary metabolite profile consisted of five peaks. One eluted close to the void, and three coeluted with authentic standards of *N*-methylcotinium ion, *N*-methylnornicotinium ion, and *N*-methylnicotinium ion. A fifth metabolite, as yet unidentified, was also detected. Tissue distribution of ^{14}C label after 24 hours was highest in the adrenal gland and epididymis followed by the gallbladder, bladder, kidney, spleen, and heart. No significant amounts of ^{14}C were found in the brain. (Auth. Abs. Mod.)

86–1017. Pruess-Schwartz, D.; Baird, W.M. **Benzo(*a*)pyrene:DNA Adduct Formation in Early-Passage Wistar Rat Embryo Cell Cultures: Evidence for Multiple Pathways of Activation of Benzo(*a*)pyrene.** *Cancer Research* 46(2):545-552, February 1986.

Benzo(*a*)pyrene (BaP):deoxyribonucleoside (DNA) adducts formed in Wistar rat embryo cell cultures following exposure to (^{3}H)BaP were isolated and identified using acid hydrolysis techniques. BaP:DNA adducts were isolated by immobilized boronate chromatography and reverse-phase high-performance liquid chromatography. Three adducts (MS1, MS2, and MS3) bound to the immobilized boronate column, indicating that they contained cis-vicinal hydroxyl groups, a configuration that would result from reaction of 7β,8α-dihydroxy-9α,10α-epoxy-7,8,9,10-tetrahydroBaP (anti-BaPDE) with DNA. However, further results indicated that, of the three adducts, only MS2 was formed from anti-BaPDE. MS1 appeared to be formed by a different mechanism of activation than a simple bay-region diol-epoxide, and MS3 appeared to result from spontaneous breakdown of a syn-BaPDE:DNA adduct. Three adducts detected did not contain cis-vicinal hydroxyl groups: M1, M2, and M3. M1 and M2 were formed from (±)-syn-BaPDE. It is concluded that isolation of individual BaP:DNA adducts followed by acid hydrolysis resulted in improved identification of BaP metabolites responsible for formation of the adducts and demonstrated the presence of multiple pathways of activation of BaP to DNA-binding metabolites. (Auth. Abs. Mod.)

86–1018. Sarto, F.; Faccioli, M.C.; Cominato, I., et al. **Aging and Smoking Increase the Frequency of Sister-Chromatid Exchanges (SCE) in Man.** *Mutation Research* 144(3):183-187, November 1985.

Frequency of sister-chromatid exchanges (SCE) was determined in lymphocytes of 88 healthy men and women not occupationally exposed to known genotoxic agents. There was uniform distribution with regard to sex, age (from 16 to 70 years), and number of smokers and nonsmokers. Average cigarette consumption was 17.1±9.2/day for men and 15.1±7.7/day for women. Analysis of SCEs/cell in paired groups showed 12.0 and 10.5 for smokers and nonsmokers ($p<0.001$), 12.3 and 10.6 for male smokers and male nonsmokers ($p<0.001$), and 11.6 and 10.4 for female smokers and female nonsmokers ($p<0.01$). Graphic representation of mean SCE frequency plotted against age for each individual yielded two regression lines, one for smokers and one for nonsmokers. The equation describing the regression line for smokers is $y=0.055\ x=9.6$ ($p<0.01$), while that for nonsmokers is $y=0.049\ x=8.38$ ($p<0.001$), where y is the SCE frequency and x is the age in years. The slope of the two lines is not significantly different, but the intercepts are ($p<0.001$). Results indicate that SCE frequency increases linearly with age and that smoking enhances frequency of SCE independently of age and sex. (Auth. Abs. Mod.)

86–1019. Segal, J.L.; Smith, C.M.; Gordon, S.K., et al. **Theophylline Pharmacokinetics in Paraplegic Subjects.** *Clinical Pharmacy* 4(4):448-451, July-August 1985.

Pharmacokinetics of theophylline following a single intravenous infusion of aminophylline was studied in paraplegic smokers versus nonsmokers to provide criteria for a rational approach to drug therapy. Pneumonia and bronchitis are primary causes of death in patients with spinal cord injuries, and bronchospasm is a major component in the pathophysiology of these diseases. A significant decrease in theophylline half-life was observed in smokers similar to that described in smokers with an intact neuraxis. A difference of 11.5 hours was noted between the extreme values of theophylline half-life range in participants. Of 19 volunteers (20 and 60 years of age), 12 were paraplegics with post-traumatic myelopathy of not less than 1 year's duration, and 7 were age- and sex-matched normal nonsmokers. Patients were considered to have "complete" spinal cord injuries (i.e., total loss of sweating, sensation, and voluntary muscle control below the cord level of injury). It is concluded that mean values of pharmacologic variables obtained from the literature or calculated from data obtained in different populations will not ensure a safe or effective dosing regimen. A simple and effective method for predicting steady-state serum theophylline concentrations using individual patient variables is recommended.

86–1020. Seino, Y.; Tsuda, K.; Mori, K., et al. **Effect of Smoking on Gastrointestinal Hormone Secretion.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 207-212.

Smoking effects on release of gut hormones such as gastrin, motilin, pancreatic polypeptide (PP), and gastric inhibitory polypeptide (GIP) (1) showed no significant difference in gastrin or GIP release compared with nonsmoking; (2) reduced intermittent fluctuation of motilin release in the fasting state (although the fluctuation interval differed in each subject) and blunted the significant rise after meal ingestion; and (3) suppressed the significant rise in PP secretion after the meal, especially the second phase of meal-induced PP secretion found in nonsmokers ($p<0.05$). L-nicotine cigarette smoking tended to reduce intermittent fluctuation in the fasting state and the peak motilin level after a meal, and had a greater suppressive effect on PP release after meals than D-nicotine (an isomer of L-nicotine) smoking, suggesting a relationship between decreased pancreatic exocrine secretion and gastrointestinal motor activity. Two experiments were performed for each hormone in men aged from 20 to 42 years.

86–1021. Sherlock, J.C.; Barltrop, D.; Evans, W.H., et al. **Blood Lead Concentrations and Lead Intake in Children of Different Ethnic Origin.** *Human Toxicology* 4(5):513-519, September 1985.

Children with one or more parents who smoked tended to have higher blood lead concentrations, in a London study of Caucasian, Asian vegetarian, and Asian nonvegetarian children aged 2 1/2 to 5 years. Data on blood lead concentrations, diet lead concentrations, lead intakes, and plasma 25-OH vitamin D metabolite concentrations indicated that (1) mean blood lead concentration of Asian children was significantly lower ($p < 0.05$) than that of Caucasian children; (2) mean concentrations of lead in the diet were 20 μg/kg for Asian vegetarian, 21 μg/kg for Asian nonvegetarian, and 23 μg/kg for Caucasian children; (3) tap water contained < 5 μg/L lead in 66 percent, 5 to 10 μg/L in 22 percent, and 20 μg/L in 4 percent of the samples; (4) Asian children had about one-half the plasma 25-OH vitamin D metabolite concentration of Caucasian children; and (5) hand-washing and parents' smoking habits influenced blood lead concentrations. Asian children tended to wash their hands before eating more often than Caucasian children, and fewer parents of Asian children smoked tobacco.

86–1022. Shirname, L.P.; Menon, M.M.; Murdia, U.S., et al. **Comparison of Mutagenicity of Indian Cigarettes and Bidi Smoke Condensates.** *Indian Journal of Experimental Biology* 23(3):145-148, March 1985.

Bidi smoke condensate (BSC) was more mutagenic than cigarette smoke condensate (CSC) in V79 Chinese hamster cells in a comparison study using Ames test, micronucleus test, and induction of eight azaguanine (AZG) resistant mutants. BSC and CSC were mutagenic in TA 98 and TA 1538 strains of *Salmonella tryphimurium*, BSC induced larger numbers of revertants than CSC, and both condensates induced elevated levels of micronucleated erythrocytes in the micronucleus test. Eight AZG resistant mutant colonies in V79 Chinese hamster cells were also induced in presence of S9 mixture. Although both condensates induced significant increases in cytochrome P-450 and aryl hydrocarbon hydroxylase (AHH) in livers of Swiss mice, BSC showed a significantly higher induction of AHH activity than CSC. Among the Indian population, bidis are smoked from a very young age by people who are generally weak and undernourished. It is suggested that sperm morphology of bidi smokers be studied to identify and assess the load of mutagenic potential in the Indian population when one or both parents smoke bidis.

86–1023. Sloan, J.W.; Martin, W.R.; Hook, R., et al. **Stereospecificity of 2-Methylpiperidine Binding to a Nicotinic Up-Regulatory Site in the Rat Brain P_2 Preparation.** *Life Sciences* 37(15):1367-1372, October 14, 1985.

Optically pure isomers of 2-methylpiperidine were resolved and binding characteristics of (±)-, (—)-, and (+)-2-methylpiperidine to rat brain P_2 preparation were studied, using (—)-(^{3}H)nicotine as the labeled ligand, to investigate the stereospecificity of nicotine up-regulatory binding sites. In the absence of 2-methylpiperidine, specific binding of (—)-(^{3}H)nicotine (1.2×10^{-8} mol) was 33.08 ± 3.49 percent of total binding. In the presence of (+) but not (—)-2-methylpiperidine, total and specific binding of (—)-(^{3}H)nicotine was significantly enhanced over a wide range of concentrations. Furthermore, (±)-2-methylpiperidine also produced more up-regulation than (—)-2-methylpiperidine. While stereospecificity of the enhancement of (—)-(^{3}H)nicotine binding by 2-methylpiperidine was observed, there was no stereospecificity with regard to inhibition of binding. Both of the stereoisomers and (±)-2-methylpiperidine were about equally effective in inhibiting (—)-(^{3}H)nicotine binding; however, the site density obtained for (+)-2-methylpiperidine was greater than that obtained for either (±)- or (—)-2-methylpiperidine. Data provide additional support for a stereospecific nicotinic up-regulatory site.

86–1024. Smolarek, T.A.; Baird, W.M. **Benzo(*e*)pyrene-Induced Alterations in the Stereoselectivity of Activation of 7,12-Dimethylbenz(*a*)anthracene to DNA-Binding Metabolites in Hamster Embryo Cell Cultures.** *Cancer Research* 46(3):1170-1175, March 1986.

To determine how benzo(*e*)pyrene (BeP, a weak tumor-initiating component of tobacco smoke) alters activation of 7,12-dimethylbenz(*a*)anthracene (DMBA) to DNA-binding metabolites, hydrocarbon-DNA adducts formed in Syrian hamster embryo cell cultures were analyzed after 24, 48, or 72 hours of exposure to 0.1 μg DMBA/mL medium in the presence of various doses of BeP. Total binding of DMBA to DNA was inhibited threefold to fourfold by high doses of BeP, while binding of DMBA to DNA was increased by low doses of BeP after 48 and 72 hours of exposure. Low doses of BeP enhanced formation of anti-DMBA-diol-epoxide:deoxyribonucleoside adducts, resulting in an increase in the total amount of DMBA bound to DNA. High doses of BeP caused a decrease in formation of all DMBA:DNA adducts and consequently a decrease in total binding of DMBA to DNA. The amount of DMBA bound to DNA in cultures exposed to 0.2 μg DMBA/mL medium for 48 hours decreased in the presence of both low and high concentrations of BeP. Results indicate that the effects of BeP on metabolic activation of DMBA depend on both the BeP:DMBA ratio and the dose of DMBA. The ability of BeP to alter the stereochemical selectivity of activation of DMBA and total amount of activated metabolites also suggests that the BeP:DMBA ratio may be an important factor in BeP-induced modifications of the induction of biological effects by DMBA. (Auth. Abs. Mod.)

86–1025. Soderkvist, P.; Poellinger, L.; Gustafsson, J.-A. **Carcinogen-Binding Proteins in the Rat Ventral Prostate: Specific and Nonspecific High-Affinity Binding Sites for Benzo(*a*)pyrene, 3-Methylcholanthrene, and 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin.** *Cancer Research* 46(2):651-657, February 1986.

The binding properties of benzo(*a*)pyrene (BaP), 3-methylcholanthrene (3-MC), and 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) to rat ventral prostatic cytosol and fractions thereof were investigated to elucidate the chemical etiology of prostatic cancer. Radioactively labeled (^3H) ligands of the three compounds bound to saturable binding sites in prostatic cytosol with apparent K_d of approximately 2 nmol and binding capacity of approximately 1 nmol/mg cytosolic protein, corresponding to approximately 5 percent of total protein content. Several lines of evidence indicated that the saturable species associated with TCDD binding was prostatic steroid binding protein (PSP), and extrapolation of equilibrium binding data indicated that both BaP and 3-MC bound to a saturable binding species similar to PSP. It is suggested that binding to PSP is responsible for the high binding capacity of carcinogens in cytosol from rat ventral prostate.

86–1026. Stavenow, L.; Hultberg, B. **Release of Fibronectin, Sulfated Glycosaminoglycans and β-Hexosaminidase From Injured Smooth Muscle Cells and Fibroblasts in Culture - Possible Transferable Effects on New Cultures.** *Acta Pathologica, Microbiologica et Immunologica Scandinavica. Section A* 93(5):215-222, September 1985.

Smoke-induced smooth muscle cell injury in development of arteriosclerosis was investigated by exposing bovine arterial smooth muscle cell cultures to dimethylsulfoxide-soluble particles (DSP) from smoke of three cigarettes. Release of fibronectin from DSP-exposed human skin fibroblasts was also examined. Fibronectin and β-hexosaminidase release was increased from injured cells; release of sulfated glycosaminoglycans was decreased. Conditioned medium from injured cells was toxic to new cultures; however, toxicity was prevented by including α_1-antitrypsin in original cultures prior to DSP exposure. Addition of vitamin E had no effect on DSP toxicity. Cell detachment was a good index of cell death after smoke exposure (judged by simultaneous measurement of DNA content and trypan blue uptake). Augmented DNA synthesis was observed in injured cells from original and new cultures during the 24-hour period following initiation of DSP-induced toxic effects. Possible mechanisms for observed responses to DSP exposure are discussed.

86–1027. Sullivan, P.D. **Free Radicals of Benzo(*a*)pyrene and Derivatives.** *Environmental Health Perspectives* 64:283-295, December 1985.

Evidence for biological involvement, spectroscopic properties (especially electron paramagnetic resonance (EPR)), and reactions of free radicals derived from benzo(*a*)pyrene (BaP) and its methylated, hydroxylated, and fluorinated derivatives are reviewed. At least four different radicals of BaP have been characterized by EPR spectroscopy, including cation and anion radicals, species formed from BaP when it is heated above the melting point, and oxygenated radicals. No evidence has been proposed for the biological involvement of the BaP anion radical or for the radical produced on heating BaP, although the latter may be related to radicals produced in cigarette smoke. Much circumstantial evidence has been presented for the biological involvement of the BaP cation radical; however, its reactivity has precluded its direct observation in either in vivo or in vitro systems. The most common radical form of BaP, which is produced both enzymatically and chemically in the presence of oxygen, has been identified as the 6-oxy-BaP radical. Although the free radical pathway leading to formation of 6-oxy-BaP is considered a pathway for BaP detoxification, it cannot be considered a totally benign pathway in view of the ability of 6-hydroxy-BaP to bind to DNA and its known toxicity and mutagenicity.

86–1028. Telisman, S.; Azaric, J.; Prpic-Majic, D. **Cadmium in Blood as an Indicator of Integrated Exposure to Cadmium in the Urban Population.** *Bulletin of Environmental Contamination and Toxicology* 36(4):491-495, April 1986.

Blood levels of cadmium (CdB) were five to six times higher in smokers than in nonsmokers among the 60 men (27 smokers, 3 ex-smokers, 30 nonsmokers) and 132 women (45 smokers, 3 ex-smokers, 84 nonsmokers) studied. In addition to the 192 adult teachers, CdB was measured in 30 boys and 22 girls attending the same schools and living in the same urban area. Heparinized venous blood samples were used for analyses. All determinations were performed in duplicate and mean values were used for calculations. The difference in CdB levels between current smokers and nonsmokers was highly significant for men and for women ($p < 0.001$). Results did not indicate any significant difference in CdB with respect to sex in adults or children, but do show a highly significant influence of age: CdB levels in adult nonsmokers were 2.5- to 3-fold higher than in children. It appears possible that this increase in nonsmokers is the result of longer exposure to cadmium and higher body burden.

86–1029. Tso, T.C.; Adams, J.D.; Haley, N.J., et al. **The Smokers' Dependence on Nicotine and the Fate of Nicotine During Tobacco Curing and Smoking and Its Reduction.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 229-238.

Biochemical measurements of smoke constituent absorption in blood samples of 450 volunteers smoking different brands of cigarettes showed that daily cigarette use was reflected in progressively higher carboxyhemoglobin and plasma nicotine in both men and women, reaching a plateau at 21 cigarettes/day. Younger men and women have similar patterns of smoke absorption and metabolism, but older men seem to inhale more deeply or metabolize nicotine to cotinine more effectively than women of the same age. The 250 smokers of cigarettes with ≥ 1 mg nicotine absorbed more nicotine/cigarette and had higher plasma levels of cotinine than the 130 smokers of cigarettes with <1 mg nicotine; plasma nicotine and cotinine level plateau was reached at 21 cigarettes/day. Levels continued to increase for those who smoked products with higher nicotine yields. Smokers of a high-yield brand (1.1 mg nicotine, 21 mg carbon monoxide) and smokers of a low-yield brand (0.4 mg nicotine, 7.0 mg carbon monoxide) had comparable blood levels of carboxyhemoglobin, thiocyanate, and cotinine, except for smokers who consumed <15 cigarettes/day. Formation of tobacco-specific N-nitrosamines during curing, aging, and smoking, particularly alterable mechanisms that can detoxify tobacco products, is also discussed.

86–1030. Tsuda, M.; Negishi, C.; Makino, R., et al. **Use of Nitrite and Hypochlorite Treatments in Determination of the Contributions of IQ-Type and non-IQ-Type Heterocyclic Amines to the Mutagenicities in Crude Pyrolyzed Materials.** *Mutation Research* 147(6):335-341, December 1985.

The contributions of IQ- and non-IQ-type mutagenic heterocyclic amines to the mutagenicities of cigarette smoke condensate, broiled sardine, fried beef, broiled horse mackerel, and albumin tar were determined by a procedure based on differential inactivation by nitrite and hypochlorite. The non-IQ-type mutagens Glu-P-2, MeAαC, and Phe-P-1, which possess a 2-aminopyridine structure in their molecule, were found to be inactivated by nitrite treatment under acidic conditions, as observed previously with Trp-P-1, Trp-P-2, Glu-P-1, and AαC. In contrast, MeIQx and 4,8- and 7,8-DiMeIQx, which have a 2-aminoimidazole moiety in their molecules (IQ-type mutagens), were very resistant to nitrite treatment. Both types of mutagenic heterocyclic amines were completely inactivated by treatment with hypochlorite. The mutagenic activity of untreated cigarette smoke condensate was 7,280 revertants/mg of basic fraction. Activity decreased to 1,123 revertants/mg of basic fraction (with 15 percent residual activity) following nitrite treatment and 680 revertants/mg of basic fraction (9 percent residual activity) following hypochlorite treatment. Results indicate that IQ-type mutagens contribute only 6 percent of the overall mutagenicity of cigarette smoke condensate.

86–1031. Turner, J.A.McM.; McNicol, M.W.; Sillett, R.W. **Distribution of Carboxyhaemoglobin Concentrations in Smokers and Non-Smokers.** *Thorax* 41(1):25-27, January 1986.

Carboxyhemoglobin concentrations in 1,933 cigarette smokers, 193 cigar smokers (39 primary, 154 secondary), and 106 pipe smokers (30 primary, 76 secondary) showed that primary pipe or cigar smokers inhale less tobacco smoke than cigarette smokers who switch to pipes or cigars. Mean carboxyhemoglobin concentration in cigarette smokers was 4.78 percent of total hemoglobin; 94.7 percent had concentrations greater than 1.7 percent. Primary cigar smokers had mean carboxyhemoglobin concentration of 0.93 percent; only 10.3 percent had concentrations greater than 1.7 percent. Primary pipe smokers also had low mean carboxyhemoglobin concentration (1.36 percent), and none had concentrations above 1.7 percent. Mean concentration in secondary cigar smokers was 6.80 percent (97.4 percent above 1.7 percent); in secondary pipe smokers, 3.39 percent (94.7 percent above 1.7 percent). Lower carboxyhemoglobin concentrations in primary pipe and cigar smokers suggest that in general they do not inhale, and higher concentrations in cigarette smokers who switch to cigars and pipes suggest that they continue to inhale and to absorb large amounts of carbon monoxide and other smoke constituents. (Auth. Abs. Mod.)

86–1032. Uziel, M.; Griffin, G.D.; Walsh, P.J. **Aryl Hydrocarbon Hydroxylase Tissue-Specific Activities: Evidence for Baseline Levels in Mammalian Tissues.** *Journal of Toxicology and Environmental Health* 16(6):727-742, 1985.

In a review of the tissue-specific activities (units/gram tissue) of arylhydrocarbon hydroxylase benzo(*a*)pyrene (AHH(BaP)), the properties of placental AHH(BaP) were found to be favorable for the concept of a baseline activity level. The 211 assays of human placentas from nonsmoking mothers showed AHH(BaP) levels of <1.5 nmol/h x g, while >95 percent of the 173 placentas from smoking mothers showed AHH(BaP)-specific activity >1.5 nmol/h x g. Assays of fetal and neonatal tissues showed baseline levels of AHH(BaP)-specific activity of <0.8 nmol/h x g. It is suggested that regular consumption of cigarettes provides sufficient chemicals to the circulating system to cause induction of AHH(BaP) in the placenta, while nonsmoking mothers show baseline activity levels. The three categories of AHH activities defined were baseline values from tissues that had been protected from exposures to AHH inducers; background levels from tissues where there had been no overt measures to protect against exposure; and induced levels resulting from overt exposure to chemical inducers. The existence of a baseline category was derived from observations that an upper limit of AHH tissue-specific activity of about 1.5 nmol/h x g tissue occurs in human placenta, human foreskin, lymphocyte, and epitheloid and fibroblastoid cell lines; mouse lung and liver; rat fetal liver and noninducible rat cell lines from lung, liver, embryo kidney, and adrenals; and hamster kidney. Animals raised under standard laboratory conditions without special dietary precautions showed background AHH activities in portal of entry tissues such as liver, lung, and intestines. Almost all tissue samples showed induced AHH levels of ≤ 500 nmol/h x g when overtly exposed to substances containing chemical inducers. This natural bimodal distribution of AHH activities may provide a reference set of values for use in quantification of the role of AHH in induction of disease. (Auth. Abs. Mod.)

86–1033. Wulf, H.C.; Husum, B.; Niebuhr, E. **Cessation of Smoking Enhances Sister Chromatid Exchanges in Lymphocytes.** *Hereditas* 102(2):195-198, 1985.

Sister chromatid exchanges (SCEs) in smokers who stopped smoking increased significantly within 1 week and remained high for the rest of the observation period (up to 124 days). SCEs in peripheral lymphocytes are higher in smokers than in nonsmokers, and it was anticipated that the SCE rate would decrease on cessation of smoking. The 19 healthy smokers (9 to 35 cigarettes/day) were persuaded to stop smoking overnight, and venous blood samples were drawn for SCE analyses before and after cessation of smoking. From each of 104 successful cultures, 30 cells were scored for SCEs. Mean SCE/cell before cessation of smoking was 9.54. Within a week, this increased to 10.55 SCE/cell ($p = 0.0013$). The reason for this initial increase remains obscure; however, it is suggested that tobacco smoke may induce certain specialized enzymes, which may lead to other unknown SCE-inducing effects when smoking is stopped. (Auth. Abs. Mod.)

86–1034. Zimmerman, M.; McGeachie, J. **The Effect of Nicotine on Aortic Endothelial Cell Turnover. An Autoradiographic Study.** *Atherosclerosis* 58(1/3):39-47, December 1985.

Nicotine contributes to the pathogenesis of arterial disease in smokers, on the basis of data that show that increased mitotic activity and cell loss are established features of endothelial injury and on findings of increased mitotic activity and cell loss in adult mice chronically exposed to nicotine. To examine the effect of systemic nicotine on mitotic activity in endothelial cells, nine adult mice were given nicotine (5 mg/kg body weight/day) for 5 weeks in drinking water (equivalent to smoking 50 to 100 cigarettes/day). Eight similar mice, not exposed to nicotine, acted as controls. After perfusion fixation, en-face preparations of aortic endothelium were processed for autoradiography. A significantly higher percentage of cells in nicotine-affected endothelium were labeled than in control cells (0.46 ± 0.11 percent vs. 0.14 ± 0.06 percent, $p < 0.01$). There was no statistically significant difference in endothelial cell density observed between the groups. The rate of cell loss (or cell turnover) was greater in nicotine-affected endothelium. (Auth. Abs. Mod.)

See also, **86–1228, 86–1229**

MORTALITY AND MORBIDITY

86–1035. Agner, E. **Smoking and Health in Old Age. A Ten-Year Follow-Up Study.** *Acta Medica Scandinavica* 218(3):311-316, 1985.

Heavy smoking in elderly men was associated with excess total mortality, excess mortality from malignant neoplasms, excess mortality from nonmalignant pulmonary diseases, and increased drop in forced expiratory volume in 1 sec (FEV_1). Health implications of smoking by the elderly were evaluated in a 10-year longitudinal study of 440 men and women who were 70 years old at entry examination. At age 70, male smokers had been smoking for a median of 55 years and female smokers for a median of 38 years; 76 percent of men and 39 percent of women were current smokers; and 32 percent of the men and 20 percent of the women inhaled. In men, heavy smoking ($\geq$ 15 g tobacco/day and inhalation) was statistically associated with low systolic blood pressure, intermittent claudication, chronic bronchitis, low body mass index, and low serum insulin, but not with FEV_1. In women, excess mortality in smokers compared with nonsmokers and noninhaling smokers was associated with inhalation ($p < 0.05$). Excess mortality was also observed in male cigarette and cheroot smokers ($p < 0.01$). Results showed heavy smoking at age 70 had an individual predictive value for death ($p < 0.001$) and for decline in FEV_1 ($p < 0.05$) in the following decade. (Auth. Abs. Mod.)

86–1036. Alderson, M.R.; Lee, P.N.; Wang, R. **Risks of Lung Cancer, Chronic Bronchitis, Ischaemic Heart Disease, and Stroke in Relation to Type of Cigarette Smoked.** *Journal of Epidemiology and Community Health* 39:286-293, 1985.

The number of manufactured cigarettes smoked daily was positively associated with ischemic heart disease, lung cancer, and chronic bronchitis in a case—control study of 12,000 inpatients aged 35 to 74 years. Risk of stroke, however, was not clearly related to smoking. The pattern of lung cancer risk, which tended to be lowest in those who had always smoked filter cigarettes, was evident only in men who additionally smoked pipes, cigars, or handrolled cigarettes, and in women. The pattern was not seen in men who smoked only manufactured cigarettes. Lung cancer risk was not clearly related to time of switch to filter cigarettes. A markedly lower risk of chronic bronchitis was seen in men (but not in women) who smoked filtered cigarettes. Heart disease risk did not vary by type of cigarette smoked 10 years before admission; however, men who had smoked filter cigarettes had a higher risk and younger women had a lower risk than those who had never smoked filter cigarettes. Compared with the general population, markedly more controls were ex-smokers, suggesting that incipient disease, whether or not smoking related, may alter smoking habits, thus affecting interpretability of findings. More controls than anticipated smoked plain cigarettes, indicating that great care must be taken in verifying validity of reporting smoking habits. Although findings agree with other evidence that risk of lung cancer and chronic bronchitis are probably reduced by switching from plain to filter cigarettes, they underline the difficulties in obtaining valid evidence from epidemiological studies. (Auth. Abs. Mod.)

86–1037. Brotherston, K.G.; Crofton, E. **Mortality and Morbidity From Smoking-Related Diseases in Parliamentary Constituencies in Scotland—A New Method of Presentation of Data.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 259-262.

A book titled *The Scottish Epidemic*, the first real attempt to produce figures for smoking-related death and disease broken down by parliamentary constituency, has made an important contribution to the growing awareness of the magnitude of the smoking problem. The Scottish people suffer from some of the highest rates in the world for death and disease from three smoking-related diseases (ischemic heart disease, lung cancer, and bronchitis and emphysema). Successive British governments have done little to combat the effects of smoking, although all have recognized it as the largest single preventable cause of death and disease. Action on Smoking and Health (ASH), a campaigning body specifically aimed at reducing the toll of death and disease from smoking, compiled the data on death rates and hospital admissions for the main tobacco-related diseases in each health board area for 71 parliamentary constituencies in Scotland. Release of the book coincided with the return of Members of Parliament (MPs) following Christmas recess in 1983. A copy was sent to every Scottish MP with a personal letter from ASH quoting figures for the MP's own constituency, emphasizing that the deaths and hospital admissions were preventable, and inviting MPs to support measures designed to reduce them. The book continues to be quoted by MPs and others. Interestingly, there has been no response from the tobacco industry.

86–1038. Carter, J. **Closing the Gap: The Burden of Unnecessary Illness.** *Journal of the American Medical Association* 254(10):1359-1360, September 13, 1985.

Four generic risk factors (tobacco, alcohol, unintended injuries, and unintended pregnancy) and two generic problem areas (delivery of prevention services, and mental health problems, especially violence, depression, and substance abuse) that are technically preventable have been identified by a Carter Center health policy consultation as the factors most responsible for unnecessary morbidity and mortality in the United States. The Carter Center at Emory University concluded that, given the current state of knowledge, more than half of premature deaths and illnesses are unnecessary and much can be done to reduce or eliminate them. A very important step involves informing the American people more thoroughly so that they may make informed, healthful choices. With regard to tobacco, Americans must be informed that its impact is substantially greater than asbestos, dioxin, and nuclear reactors. Of special concern are teenagers who do not learn that cigarette smoking is addictive until it is too late and who believe that smokeless tobacco is as harmless as chewing gum, and women who are being victimized by tobacco advertising campaigns in women's magazines. A cooperative effort by physicians and others is needed to reduce unnecessary suffering, focus health care and research dollars where they are most needed, and increase social justice. See also 86-1039.

86–1039. Foege, W.H.; Amler, R.W.; White, C.C. **Closing the Gap. Report of the Carter Center Health Policy Consultation.** *Journal of the American Medical Association* 254(10):1355-1358, September 13, 1985.

Tobacco was identified as the leading generic risk factor associated with mortality, measured by unnecessary deaths or unnecessary years of life lost, at a Carter Center meeting held to develop and recommend priorities for interventions directed at unnecessary morbidity and mortality in the United States. Medical specialists reported on the burden imposed by cancer, heart disease, diabetes, and 11 other priority health problems, and quantified preventable morbidity and premature mortality associated with specific risk factors or available interventions. Major recommendations were to (1) make nonsmoking the social norm and reduce all opportunities for consumption of tobacco; (2) compensate victims of diseases caused by tobacco; (3) explore the moral dilemma posed by the continual production of tobacco for profit; and (4) neutralize misleading advertising and increase public knowledge about the risks. Other high priority generic risk factors include alcohol, injury risks, and unintended pregnancy; mental health problems and delivery of prevention services were identified as high priority generic problems.

86–1040. Garrison, R.J.; Castelli, W.P. **Weight and Thirty-Year Mortality of Men in the Framingham Study.** *Annals of Internal Medicine* 103(6, Part 2):1006-1009, December 1985.

Data from 30 years of biennial examinations and mortality information on men who participated in the Framingham study were analyzed for relationship between relative weight, smoking, and longevity. When mortality rate for desirable weight (nonsmokers) was used as the base rate, relative risk of premature death (before age 70) for men who were 30 to 39 years of age at first examination was 3.9 for overweight nonsmokers, 8.8 for smokers, and 9.8 for overweight smokers. Metropolitan Relative Weight (MRW), measured at the baseline examination, was strongly related to mortality over 30 years, with men weighing between 100 and 109 percent having minimum mortality. Interim relative weights were related to death in the next 2-year period by cross-sectional pooling analysis. Multivariate analysis showed a strong positive relationship between baseline relative weight and death occurring in any interval, despite an inverse relation between interim weight and death. Overweight (> 110 percent) nonsmokers had 30-year mortality rates up to 3.9 times higher than men of desirable weight. There was no evidence that weight gains during middle age increased longevity or that desirable weights increased with age. (Auth. Abs. Mod.)

86–1041. Jayant, K.; Notani, P.; Sanghvi, L.D. **Health Consequences of Smoking in Two Socioeconomic Classes in Bombay, India.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983*, Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 149-156.

Comparison of two socioeconomic classes in India showed that bidi smoking carried a significantly greater risk of death and myocardial infarction than cigarette smoking. Bidi smoking, common among the 5,981 blue-collar workers sampled, was associated with a twofold to threefold increase in risk of death, coronary heart disease (CHD), and myocardial infarction and with a fivefold increase in risk of cancer of the upper alimentary and respiratory tracts compared with nonsmokers of the same class. Cigarette smokers had a threefold increase in CHD risk, but the more than twofold increased risk of mortality and myocardial infarction fell short of significance. Risk of upper alimentary tract cancer was 6.19 in cigarette smokers. Among 6,742 white-collar workers, cigarette smokers did not have a significantly higher risk for either mortality or morbidity. However, a significantly higher risk of CHD (2.03, $p<0.05$) and myocardial infarction (2.90, $p<0.05$) was observed among heavy smokers (≥ 20 cigarettes/day). It is concluded that blue-collar cigarette smokers have a threefold higher risk of mortality and a ninefold higher risk of cancer of the upper alimentary and respiratory tracts than white-collar cigarette smokers.

86–1042. Li, W.-X. **Cigarette Smoking and Excess Mortality in Shanghai, China. Evidence From a Prospective Study.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983*, Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 157-164.

Mortality among smokers was higher than among nonsmokers over a 10-year period among 2,923 (1,636 men) Shanghai factory workers. Males, who had an overall higher mortality than females, also had a much higher age-adjusted percentage of smokers (59.5 percent) than females (9.8 percent). Cancer mortality (lung, stomach, liver and biliary tract) was significantly higher in male smokers than in nonsmokers (64 percent excess mortality). Among female smokers, excess mortality from cardiovascular disease and other diseases was 68.2 percent and 88 percent, respectively. A mass survey in 1972 of coronary heart disease identified workers in three different factories. Mortality data were collected yearly for 9 years. A total of 161 deaths (123 male, 38 female) was recorded.

86–1043. Paffenbarger, R.S., Jr.; Hyde, R.T.; Wing, A.L., et al. **Physical Activity, All-Cause Mortality, and Longevity of College Alumni.** *New England Journal of Medicine* 314(10):605-613, March 1986.

Physical activity, smoking, and other lifestyle characteristics of 16,936 Harvard alumni (aged 34 to 74) were examined for relationship to mortality rates from all causes and for influence on longevity. Cardiovascular disease (45 percent), cancer (32 percent), natural causes (13 percent), and trauma (10 percent) were underlying causes of death for 1,413 alumni during the 12 to 16 years of followup (1962 to 1978). Relative risks of death for individuals were highest among cigarette smokers and men with hypertension, and attributable risks in the community were highest among smokers and sedentary men. Exercise reported as walking, stair climbing, and sports play related inversely to total mortality, primarily to death as a result of cardiovascular or respiratory causes. Death rates declined steadily as energy expended on such activity increased, and rates were one-quarter to one-third lower among alumni expending 2,000 or more kcal/week during exercise than among less active men. With or without consideration of hypertension, cigarette smoking, extremes or gains in body weight, or early parental death, alumni mortality rates were significantly lower among the physically active. Risk of death was decreased by 43 percent with cessation of smoking. By 80 years of age, the amount of additional life attributable to adequate exercise was 1 to more than 2 years. (Auth. Abs. Mod.)

NEOPLASTIC DISEASES

86–1044. Austin, H.; Delzell, E.; Grufferman, S., et al. **A Case-Control Study of Hepatocellular Carcinoma and the Hepatitis B Virus, Cigarette Smoking, and Alcohol Consumption.** *Cancer Research* 46(2):962-966, February 1986.

No consistent dose—response relationship was found between cigarette consumption level and etiology of hepatocellular carcinoma (HCC) in an evaluation of the effects of hepatitis B virus (HBV), cigarette smoking, and alcohol use. Smoking effects on HCC among hepatitis B surface antigen (HBsAg)-negative persons were of special interest because it has been suggested that the relative effect of smoking on HCC is higher among HBsAg-negative persons than among HBsAg-positive persons. Examination of the 86 cases and 161 hospital controls confirmed a strong relationship between HBV and HCC. Serum HBsAg showed that 12 of 67 cases (none of the 63 controls) were chronically infected with HBV. There was also a moderately strong relationship between alcohol use and HCC, but results failed to support the hypothesis that cigarette smoking is a risk factor for HCC. Overall, the relative rate of HCC for cigarette smokers compared with nonsmokers after adjustment for alcohol consumption was 1.0. Among HBsAg-negative subjects, relative risk was 1.1. (Auth. Abs. Mod.)

86–1045. Bateson, E.M. **Radiological Appearances of Primary Lung Cancer in Aboriginals of the Northern Territory of Australia.** *Australasian Radiology* 29(2):126-129, May 1985.

A 10-year survey of all proven primary lung cancer cases at a Darwin hospital found that tobacco smoking may be a factor in incidence among Australian aboriginals. Although only 41 cases were diagnosed, incidence was more common in aboriginals than in nonaboriginals. Of the 123,324 aboriginals in the Northern Territory (1981 census), 54,414 are aged ≥ 40 years. Pipe smoking in North Queensland and the Northern Territory is quite common among the natives (both men and women) and plays an important role in social and ceremonial occasions. According to one study, the craving for tobacco is so strong that aboriginals undertake long journeys to obtain supplies. Cigarettes are usually rolled from pipe tobacco and probably have a higher tar content than manufactured cigarettes, which may be the factor in incidence of lung cancer. Radiological appearances of both central and peripheral types of cancer indicated a more advanced disease stage in aboriginals than in nonaboriginals, suggesting that aboriginals tend to seek medical advice at a later date.

86–1046. Belinsky, S.A.; White, C.M.; Boucheron, J.A., et al. **Accumulation and Persistence of DNA Adducts in Respiratory Tissue of Rats Following Multiple Administrations of the Tobacco Specific Carcinogen 4-(*N*-Methyl-*N*-nitrosamino)-1-(3-pyridyl)-1-butanone.** *Cancer Research* 46(3):1280-1284, March 1986.

Data demonstrate marked accumulation of promutagenic DNA adducts in target tissues during repeated exposure to 4-(*N*-methyl-*N*-nitrosamino)-1-(3-pyridyl)-1-butanone (NNK). Formation and removal of 7-methylguanine and the promutagenic lesions O^6-methylguanine (O^6mGua) and O^4-methyldeoxythymidine (O^4mThd) were determined over 12 days of NNK administration to rats (100 mg/kg/day). DNA alkylation was greatest in the nasal mucosa, followed by liver and lung after one dose of NNK. No DNA adducts were detected in kidney and brain under these conditions. Concentration of O^6mGua increased steadily in lung throughout treatment, while O^6mGua-DNA methyltransferase (O^6mGuaMT) decreased to less than 5 percent of control. Concentration of O^4mThd in lung DNA reached a steady state after 4 days of NNK treatment. After NNK treatment was discontinued, O^6mGua persisted while O^4mThd was removed rapidly in the lung, suggesting that different repair pathways exist for removal of these adducts in vivo. In hepatocytes, nonparenchymal cells, and nasal mucosa, O^6mGua concentrations, maximal after 1 to 2 days of treatment, declined by 50 to 80 percent thereafter. The decrease in nasal mucosa paralleled a decline in O^6mGuaMT activity and was associated with marked cytotoxicity to Bowman's glands, portions of the lateral nasal gland, and olfactory and respiratory mucosa. The decline in O^6mGua in hepatocytes was attributed to induction of O^6mGuaMT activity. (Auth. Abs. Mod.)

86–1047. Campbell, M.J. **Multiplicative and Additive Models With External Controls in a Cohort Study of Cancer Mortality.** *Statistics in Medicine* 4(3):353-360, July-September 1985.

The use of additive and multiplicative models is examined for a cohort study of 2,696 women followed up for 12 years. Preliminary data analysis revealed that hemoglobin level increased with age after menopause and that smokers had a higher level of hemoglobin than nonsmokers. The multiplicative model implied that women with a hemoglobin level of < 12 g/dL were at higher risk of cancer; the additive model showed that the risk was confined to postmenopausal women. Differences in application and in interpretation of both models are discussed. It is concluded that despite difficulties in fitting and in interpretation, additive models can be useful in the analysis of cohort studies. (Auth. Abs. Mod.)

86–1048. Eddy, D.M. **Setting Priorities for Cancer Control Programs.** *Journal of the National Cancer Institute* 76(2):187-199, February 1986.

A simple method for comparing effectiveness and costs of different cancer control activities is described and its use is illustrated by evaluating priorities for controlling oral cancer in developing countries. The method estimates the long-term effects of prevention, screening, detection, treatment, and support activities (e.g., pain control) on morbidity, mortality, measures of quality of life, and cost for a specified population. Cost effectiveness of various combinations of activities for one or more cancers can be compared to help set priorities for cancer control programs. The method was originally designed at the request of the World Health Organization for use in developing countries with the requirements that it (1) be easy to use; (2) require only available, collectible, or estimable data; (3) fit on a single sheet of paper; and (4) be usable with pencil and paper or a hand calculator. Despite these restrictions, the method is applicable to setting priorities for cancer control programs of any size, from clinic and community programs to national cancer programs. In one application, method analysis of two primary prevention activities, two screening activities, and three treatment activities to control oral cancer in Sri Lanka indicates that highest priorities should be given to primary prevention activities such as antitobacco education and to screening. (Auth. Abs. Mod.)

86–1049. Filippazzo, M.G.; Aragona, E.; Cottone, M., et al. **Assessment of Some Risk Factors for Hepatocellular Carcinoma: A Case Control Study.** *Statistics in Medicine* 4(3):345-351, July-September 1985.

Alcohol consumption, smoking habits, and hepatitis B infection as risk factors for hepatocellular carcinoma (HCC) were investigated in 120 HCC patients and 360 age- and sex-matched controls selected from among other hospitalized patients. Each HCC patient was matched with one patient with liver cirrhosis, one with solid tumor, and one with chronic illness other than cancer or liver disease. Prevalence of heavy smoking (>20 cigarettes/day) was similar in cases and cirrhotic or nonneoplastic controls, but was significantly higher in controls with cancer. When 48 patients with lung cancer and high prevalence of heavy smoking (85 percent) were excluded, prevalence of heavy smoking was similar to that of other groups. Alcohol abuse and heavy smoking were independent of each other in HCC and cirrhosis groups, but were related in the other control groups where alcoholics were usually heavy smokers. Hepatitis B surface antigen negative-HCC with an ultrasonographic pattern of diffuse alternation was more frequent in heavy smokers.

86–1050. Fitzpatrick, J.M.; Reda, M. **Bladder Carcinoma in Patients 40 Years Old or Less.** *Journal of Urology* 135(1):53-54, January 1986.

Of 50 patients aged 40 years or less with transitional cell carcinoma of the bladder admitted to a Dublin hospital between 1967 and 1982, almost two-thirds were current smokers. Patients were divided into group 1, 24 patients from 15 to 30 years of age, and group 2, 26 patients aged 31 to 40 years. In group 1, 64 percent smoked 19.3±7.7 cigarettes/day compared with 22.7±17.3 cigarettes/day for 63 percent of group 2. Smoking prevalence in both groups was considerably higher than the 32 percent rate for the adult population of the Republic of Ireland. Two group 1 patients (8 percent) and 14 group 2 patients (54 percent) had recurrences during followup. In group 1, one of the patients was a current smoker (20 cigarettes/day) and the other was an ex-smoker. In group 2, 9 of the 14 patients with recurrences were current smokers. Prognosis in group 1 patients was favorable, although careful followup is recommended for this age group. Prognosis in group 2 patients was worse and is comparable with prognosis at age 40 years or older.

86–1051. Hanssen, H.-P.; Agarwal, D.P.; Goedde, H.W., et al. **Association of N-Acetyltransferase Polymorphism and Environmental Factors With Bladder Carcinogenesis.** *European Urology* 11(4):263-266, 1985.

Potential risk factors for bladder cancer such as smoking, occupational exposure, drug abuse (analgesics and artificial sweeteners), and urological anamnastic predispositions were evaluated in relation to disease staging and grading and the N-acetyltransferase phenotype in 105 north German patients with bladder cancer and 42 healthy controls. Among patients, 82 were smokers and 23 had never smoked, and 27 indicated occupational exposure to potential bladder carcinogens (dye, varnish, rubber, or printing industries). The slow acetylator phenotype was identified in 61.9 percent of patients compared with 42.9 percent of controls. Differences in acetylator ratios between smokers and nonsmokers were not significant, although a slight excess of slow acetylators was observed among smokers. Staging and grading data revealed that superficial and highly differentiated tumors occurred more frequently among slow acetylators. This association was specifically noted among slow acetylator phenotype smokers with an additional occupational risk factor who showed a significant excess in superficial (stage O, A) and highly differentiated carcinoma (grade I through III). Overall, cigarette smoking was found to be an etiological factor that was largely confined to infiltrating, less differentiated tumors.

86–1052. Hecht, S.S.; Trushin, N.; Castonguay, A., et al. **Comparative Tumorigenicity and DNA Methylation in F344 Rats by 4-(Methylnitrosamino)-1-(3-pyridyl)-1-butanone and *N*-Nitrosodimethylamine.** *Cancer Research* 46(2):498-502, February 1986.

The tumorigenic activities and DNA-methylating abilities of the tobacco-specific nitrosamine 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) and the structurally related nitrosamine *N*-nitrosodimethylamine (NDMA) were compared in F344 rats. Groups of 30 male rats received 30 subcutaneous injections of 0.0055 mmol/kg of either NNK or NDMA over a 20-week period (total dose 0.33 mmol/kg) and tumorigenic effects were determined after 104 weeks. Following NNK and NDMA treatment, liver tumors developed in 10 and 6 rats, respectively; lung tumors in 13 and 0; and nasal cavity tumors in 6 and 1, respectively. NNK was significantly more tumorigenic than NDMA in the lung ($p<0.01$) and nasal cavity ($p<0.05$). DNA methylation was studied by treating groups of rats with a single subcutaneous injection of 0.39 mmol/kg or 0.055 mmol/kg of NNK or NDMA and determining levels of 7-methylguanine and O^6-methylguanine in liver, lung, and nasal mucosa 1 to 48 hours after treatment. In liver and lung, levels of 7-methylguanine and O^6-methylguanine in DNA were 3 to 22 times greater in rats treated with NDMA than in those treated with NNK ($p<0.001$). Levels of methylation induced in nasal mucosa were similar. Results demonstrate that NNK is a more potent tumorigen than NDMA in F344 rats and suggest that DNA methylation alone does not account for its strong tumorigenicity in rat lung and nasal mucosa. (Auth. Abs. Mod.)

86–1053. Hobom, B. **Durch Zigarettenrauch Entstehen DNS-Einzelstrangbruche. [Cigarette Smoke Induces DNA Single-Strand Breakage.]** *Fortschritte der Medizin* 103(37):873, October 3, 1985, German.

A previous report of the effects of smoke on DNA (*Nature* 314(6010):462-464, April 4, 1985) is reviewed and results are discussed in relation to lung cancer pathogenesis. Epithelial lung carcinoma cells exposed to cigarette smoke for 1 hour produced approximately 10,000 single-strand breaks in each cell. Addition of catalase and superoxide dismutase reduced the number of single-strand breaks, indicating that oxygen radicals are responsible for the clastogenic activity of cigarette smoke. Exposure of pure DNA to cigarette smoke resulted in dose-dependent single-strand breaks. Cancer formation can occur if breaks are not repaired within the lung. Substances have been identified in cigarette smoke that induce mutations in bacteria and human cells. Incidence of benzopyrene-induced cell formation in hamster embryo cells is increased by cigarette smoke and by phorbol esters. Oxygen radicals inducing single-strand breakage originate from polyphenols in cigarette smoke. Although the single-strand breaks observed can usually be repaired by the cell, the probability of chromosomal alterations and inability of repair increases with increasing cigarette consumption. See also 85-1310.

86–1054. Horm, J.W.; Kessler, L.G. **Falling Rates of Lung Cancer in Men in the United States.** *Lancet* 1(8478):425-426, February 1986.

The decline in lung cancer incidence and mortality in white men in the United States may signal the beginning of a downturn in the disease consistent with (1) the Surgeon General's report on smoking and health in 1964; (2) warning labels on cigarette packs and in advertising since 1966; (3) introduction and acceptance by smokers of filter-tipped cigarettes; and (4) development and use of low-tar and low-nicotine cigarettes. The number of male smokers decreased from slightly over 50 percent in 1965 (and before) to about 38 percent in 1980 and about 35 percent in 1983. Considering a lag of 20 to 25 years between patterns of smoking and lung cancer, it is anticipated that lung cancer incidence and mortality in American men will continue to fall for the next two to three decades. However, lung cancer incidence and mortality among American women continue to increase at about 6 percent/year. Smoking rates among women remained at about 32 percent from 1965 to 1976, declining to about 29 percent by 1983. The decline in smoking prevalence in women is about 20 years behind that of men, and a decline in age-adjusted lung cancer rates for women is not anticipated until early in the next century.

86–1055. Hoshino, H.; Hirayama, T.; Arimoto, H., et al. **Gastric Cancer Risk Factors: A Case-Control Study Based on Medical Records.** *Japanese Journal of Cancer Research* 76(9):846-850, September 1985.

Smokers from families prone to develop gastric cancer have a greater risk of developing gastric cancer than smokers with cancer-free history and cancer-prone nonsmokers. Among 460 gastric cancer patients and an equal number of age-matched controls, the combined effect appeared to be syncarcinogenic. Relative risk (RR) of gastric cancer in nonsmokers without a family history of cancer was 1.0; RR for nonsmokers with a family cancer history was 1.65; RR for smokers without family cancer history was 3.08; and RR for smokers with a family history of cancer was 4.24. However, if gastric cancer cases with a family history of other cancers were considered as having no family history of gastric cancer, relative risks of gastric cancer became 1.0, 1.67, 2.88, and 4.3, respectively. Relative risks of gastric cancer in subjects with gastric cancer family history alone at age under 59 years and over 60 years were 1.76 and 1.62, respectively; without gastric cancer family history and with smoking habit, 2.83 and 3.08, respectively; and with both gastric cancer family history and smoking habit, 5.30 and 3.49, respectively. Relative risk of gastric cancer in subjects with gastric cancer family history and smoking habit under 59 years of age was statistically significant compared with cases of gastric cancer family history alone or smoking habit alone under 59 years of age.

86–1056. La Vecchia, C.; Decarli, A. **Correlations Between Cancer Mortality Rates From Various Italian Regions.** *Tumori* 71(5):441-448, October 1985.

Cancer mortality patterns based on death certification from 20 Italian regions from 1969 to 1973 showed higher rates for several common cancers in the northern areas of the country. High positive correlations were found between various tobacco-related cancers in both sexes (somewhat higher for males) and positive correlations between most intestinal sites and between a well-defined group of other cancers, including intestines in both sexes, breast and ovary in females, and prostate in males. Males had a more than twentyfold excess of cancer of the esophagus and a more than fourfold increase in cancer of the lung, upper respiratory and gastrointestinal tract, pancreas, and liver. In females, variations were lower for most common cancers (with the exception of gallbladder). Relatively limited geographical differences were evident for breast cancer in females and for brain tumors, leukemias, and other nonepithelial cancers in both sexes. (Auth. Abs. Mod.)

86–1057. Mani, N.J. **Tobacco Smoking and Associated Oral Lesions.** *Annals of Dentistry* 43(1):6-14, Summer 1984.

Smoking habits were associated with high prevalence of oral cancer and precancerous lesions among 57,518 Indian industrial workers studied over a 4-year period beginning in 1967. Of 40,697 smokers (70.5 percent), incidence of nicotine stomatitis (29.6 percent), leukoplakia (13.5 percent), and leukoedema (4.3 percent) was highest in the 20,526 (35.69 percent) who used only one form of tobacco. Bidi smoking was the most common (81.19 percent), followed by cigarette (6.59 percent), hukkah (5.78 percent), chilam (5.20 percent), pipe (1.20 percent), and cigar (0.04 percent). Prevalence of lesions increased with higher frequency and duration of smoking, and showed a pronounced increase during earlier stages of smoking. Prevalence of lesions reached a higher level much faster among pipe, chilam, and hukkah smokers. There was an appreciable reduction in lesions among smokers who quit. (Auth. Abs. Mod.)

86–1058. Mani, N.J. **Preliminary Report on Prevalence of Oral Cancer and Precancerous Lesions Among Dental Patients in Saudi Arabia.** *Community Dentistry and Oral Epidemiology* 13(4):247-248, August 1985.

Prevalence of oral cancer and precancerous lesions and their association with tobacco habits was studied in 674 dental patients (69 percent Saudi Arabian nationals) examined at their first visit to the College of Dentistry, King Saud University, over a 1-year period. Prevalence was 1.9 percent for leukoplakia, 8.3 percent for leukoedema, 2.5 percent for nicotinic stomatitis, and 0.6 percent for lichen planus. Except for lichen planus, all lesions were found almost exclusively in men and were closely associated with oral tobacco habits. Twelve patients had leukoedema and nicotinic stomatitis, three had leukoedema and leukoplakia, two had leukoplakia and nicotinic stomatitis, and one patient had all three lesions. Although leukoedema and nicotinic stomatitis were observed almost exclusively among tobacco smokers (cigarettes or sisa, a water pipe similar to hukkah), leukoplakia was prevalent among smokers and shammah (snuff) users. All patients who used shammah developed leukoplakia in the mouth area where it was habitually kept. Oral cancer was found in only one non-Saudi Arabian.

86–1059. Nishiyama, H.; Yano, H.; Nishiwaki, Y., et al. **Lung Cancer in Chromate Workers—Analysis of 11 Cases.** *Japanese Journal of Clinical Oncology* 15(3):489-497, September 1985.

Among 11 male workers occupationally exposed to chromate (17 to 29 years) who developed lung cancer, 10 were heavy smokers. Average age was 53.9 years; age of disease onset ranged from 41 to 68 years. Smokers consumed an average of ≥ 20 cigarettes/day for 31.3 (mean) years. One worker was a nonsmoker. Perforation of the nasal septum was observed in seven patients. Cancers were located in the left upper lobe in four cases, in the left lower lobe in four, in the right upper lobe in three, and in the right lower lobe in one (nine squamous cell carcinomas and three small cell carcinomas). Four squamous cell carcinomas were hilar type early stage cancers; two were found in one patient. Chromium content of lung tissue in seven patients tested was from 13.9 to 2,368.4 μg/g of dry tissue and was higher than that of lung or nonlung cancer cases without chromate exposure. No severe dysplasia of bronchial epithelium was observed. (Auth. Abs. Mod.)

86–1060. Olsen, J.; Sabroe, S.; Ipsen, J. **Effect of Combined Alcohol and Tobacco Exposure on Risk of Cancer of the Hypopharynx.** *Journal of Epidemiology and Community Health* 39:304-307, 1985.

Moderate or heavy use of tobacco and alcohol has a multiplicative rather than additive effect on risk of hypopharyngeal cancer, similar to that found for laryngeal cancer. Results are based on 32 hypopharyngeal cancer patients (26 males between 55 and 74 years of age), 321 patients with cancer of the larynx, and 1,141 controls. Patients were stratified into (1) not exposed, less than 10 g tobacco/day and less than 10 drinks/week, or 150 g alcohol; (2) exposed to tobacco only (less than 10 drinks/week); and (3) exposed to alcohol only (less than 10 g tobacco/day). Tobacco content of cigarettes was set at 1 g, cigars at 3 g, and pipes at 2.5 g. Similar results were found when hypopharyngeal cancer patients were compared with only matched controls. Smoking and drinking habits were found to be similar for hypopharyngeal cancer patients and laryngeal cancer patients. (Auth. Abs. Mod.)

86–1061. Olson, K.B. **Rejected Landmarks: The Smoke Goes On. (Letter).** *Journal of the American Medical Association* 255(8):1017, February 1986.

An article ("Cancer and Tobacco Smoking") about a prospective study of smoking habits of all male admissions to Roswell Park Memorial Institute (Buffalo, N.Y.) in 1938 was published in the same 1950 journal that included the report of a study indicating strong but inconclusive evidence of a relationship between smoking and lung cancer (reprinted in *Journal of American Medical Association* 253(2):2986-2994, May 24-31, 1985). To investigate the relationship of cigarette smoking with cancer of all types, 1,043 patients had been interviewed and compared with 605 noncancer patients. Both articles came to the same conclusion. Publication of both articles came only after use of a long and persuasive argument, according to one of the authors of the second article. See also 85-1706.

86–1062. Ooi, W.L.; Elston, R.C.; Chen, V.W., et al. **Increased Familial Risk for Lung Cancer.** *Journal of the National Cancer Institute* 76(2):217-222, February 1986.

Demographic and morbidity and mortality data, occupational and industrial experiences, and tobacco use among family members of 336 deceased lung cancer probands and 307 controls (proband spouses) were analyzed to determine whether lung cancer clusters in families. First-degree relatives of probands, compared with first-degree relatives of controls, showed a strong excess risk for lung cancer. Overall, male relatives of probands had a greater risk for lung cancer than their female counterparts. The risk was fourfold for parents of probands compared with parents of spouses. The risk in female relatives of probands over 40 years of age was nine times higher than similarly aged female controls, even among nonsmokers who had not reported excessive exposures in hazardous occupations. The risk was fourfold to sixfold for heavy smokers. There were more relatives of probands who had smoked more than two packs of cigarettes/day ($p < 0.05$) and 1.3 times as many relatives of probands who had smoked an average of ≥ 60 pack-years ($p < 0.05$). More than 85 percent of all smokers had smoked > 15 years, and about half had smoked 21 to 30 years. After controlling for confounding effects of age, sex, cigarette smoking, and occupational and industrial exposures, relationship to proband remained a significant determinant of lung cancer, with a 2.4-fold greater risk among relatives of probands. (Auth. Abs. Mod.)

86–1063. Suarez Nieto, C.; Cuesta Garcia, A.; Fernandez Bustillo, E., et al. **Serum Glycoproteins and Prognosis in Cancer of the Head and Neck.** *Clinical Otolaryngology* 11(1):41-45, February 1986.

Three acute phase proteins (APPs, α_1-acid glycoprotein, α_1-antitrypsin, and haptoglobin) were significantly elevated in 44 patients with head and neck cancer compared with levels in 20 healthy smokers in a control group. Given that the majority of patients with cancer of the head and neck are heavy smokers, values for APP in patients ought to resemble those of a control population of smokers. The other proteins studied (α2-HS glycoprotein and prealbumin) showed no differences and do not appear to have any predictive value in these cancers. The three primary glycoproteins were considerably elevated in patients, particularly in stage IV. In the group of patients who died before 30 months after treatment, haptoglobin was significantly elevated compared with levels in patients who survived beyond this point. Only values for α_1-acid glycoprotein >150 mg/dL were a prognostic factor of similar precision to that of stage IV. This correlation could not be shown for the other glycoproteins. (Auth. Abs. Mod.)

86–1064. Tate, C.F., Jr. **Lung Cancer—The Case for Prevention.** *Journal of the Florida Medical Association* 72(1):22-24, January 1985.

Physician activism, which could alter the course of death and disease caused by smoking, can begin with a change from the traditional medical attitude of not becoming involved. Smoking is responsible for 85 percent of lung cancer cases, and data suggest that passive smoke from a spouse or from working associates may account for the remaining 15 percent. Approximately 8 to 10 years after cessation of smoking, the smoker's high risk for coronary heart disease death tends to drop back to the nonsmoker's risk level and emphysema progression is altered almost immediately. Physicians can join forces with the American Cancer Society, American Heart Association, and American Lung Association to support efforts to control smoking through State legislation. The National Coalition on Smoking or Health recommends that all States and local areas establish similar coalitions to implement legislative action against smoking. Physicians can address health maintenance organizations and other groups who profit by preventing major illnesses and hospitalizations, and big business corporations or health care coalitions, on the effects that tobacco use has on health care costs. Finally, physicians can take on more responsibility for the education of their patients. It is time for a change in attitude and for aggressive action.

86–1065. Tollefson, L. **The Use of Epidemiology, Scientific Data, and Regulatory Authority to Determine Risk Factors in Cancer of Some Organs of the Digestive System. 2. Esophageal Cancer.** *Regulatory Toxicology and Pharmacology* 5(3):255-275, September 1985.

In a research review of the epidemiology and etiology of esophageal cancer, it is noted that alcohol and tobacco are synergistic factors that increase the risk of esophageal cancer. In North America and Western Europe, 90 percent or more of the risk has been attributed to alcohol and tobacco; however, in the high incidence areas of Asia and Africa, the evidence is much less conclusive. In China, alcohol and tobacco use accounts for no more than a small fraction of the high incidence of esophageal cancer. Etiology is complex; environment is of major importance, but low socioeconomic status is also a risk factor. The esophageal cancer belt has provided no clues to underlying causes. The majority of factors implicated in the disease appear to act directly on the esophagus rather than systemically, an unusual situation in that it enables the disease to be prevented by primary means. The enormous disparity in etiology of the disease that exists among various countries may be more apparent than real if epidemiologic data are interpreted to mean that a two-stage process is involved with multiple etiologies for each stage. Nutritional deficiencies and diet do not explain the whole picture. Tobacco may be the culprit in one culture, fungal elements in another. It is suggested that if the relationship between esophagitis and nutritional status were elucidated and if the condition could be eliminated by dietary factors, the association between esophagitis and nutritional status might suggest methods of primary prevention of esophageal cancer. (Auth. Abs. Mod.)

86–1066. Vutuc, C.; Gredler, B. **Lung Cancer Risk and Tar Yields of Cigarettes Smoked.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 239-242.

Lung cancer risk was higher among smokers of high-tar cigarettes than among smokers of low-tar cigarettes in a study comparing brands with tar yields per cigarette of <15 mg (group 1), 15 to 24 mg (group 2), and >24 mg (group 3). Austrian nationwide case—control data obtained from 1,580 men with lung cancer and 3,160 controls, and 297 women with lung cancer and 580 controls, showed that significantly more lung cancer patients than controls ($p<0.01$) were cigarette smokers (including ex-smokers). Among women, 188 of 297 cases (63 percent) and 119 of 580 controls (21 percent) were smokers. Among men, 248 of 252 cases (98 percent) and 536 of 839 controls (64 percent) were cigarette smokers. Smokers consuming group 3 cigarettes had significantly higher lung cancer risk (6.3 for women, $p<0.01$; 25.1 for men, $p<0.01$) than smokers of group 2 cigarettes, taking into account the variations in daily consumption. Data on a younger cohort show a decreasing trend of lung cancer mortality with declining cigarette tar yields. It is concluded that although quitting smoking is the only really safe way to avoid lung cancer, reduction of tar yields has an important influence on risk.

86–1067. Zunzunegui, M.V.; King, M.-C.; Coria, C.F., et al. **Male Influences on Cervical Cancer Risk.** *American Journal of Epidemiology* 123(2):302-307, February 1986.

The sexual behavior and smoking habits of husbands as factors in the epidemiology of squamous cell carcinoma of the uterine cervix were examined among 39 low-income, married Hispanic women and age-matched controls identified at public hospitals and community clinics in the San Francisco Bay area. All couples were interviewed to assess social class, reproductive and sexual history, smoking, alcohol consumption, and nutrition. More husbands of cases than of controls were classified as smokers (defined as past or current history of smoking). In addition, husbands of cases smoked more cigarettes/day (10 vs. 4, respectively) and for more years (19 vs. 10, respectively) than husbands of controls. Few women smoked, and no difference was observed between cases and controls. Cases were 5.3 times more likely than controls to be married to husbands who had 20 or more sexual partners. Cases and controls did not differ in number of sexual partners, but cases were younger than controls at first intercourse. Results support the hypothesis that cervical cancer is due to sexual transmission of an infectious agent and tentatively suggest a possible association between cervical cancer risk and husbands' smoking habits. (Auth. Abs. Mod.)

See also, **86–1218, 86–1221, 86–1227, 86–1233, 86–1234, 86–1238, 86–1239**

NON—NEOPLASTIC RESPIRATORY DISEASES

86–1068. Bowen, R.M.; Hoidal, J.R.; Estensen, R.D. **Urokinase-Type Plasminogen Activator in Alveolar Macrophages and Bronchoalveolar Lavage Fluid From Normal and Smoke-Exposed Hamsters and Humans.** *Journal of Laboratory and Clinical Medicine* 106(6):667-673, December 1985.

Cigarette smoke had no demonstrable effect on plasminogen activator (PA) activity in alveolar macrophages (AMs) and lower respiratory tract fluid from hamsters and humans. Results indicate that PAs are present in AMs and lower respiratory tract fluid of hamsters and humans and that control and characteristics of PA in hamsters and humans were strikingly different. Freshly harvested hamster AMs had barely detectable PA intracellularly; no detectable activity was seen in concentrated lavage fluid. In contrast, readily detectable PA activity was found in lysates of freshly harvested human AMs and lavage fluid. PA secretion was enhanced sixfold by phorbol myristate acetate (PMA) and suppressed by dexamethasone in hamsters, but was unaffected in humans. PA secretion by hamster AMs in the control, PMA, and dexamethasone groups was 144, 912, and 36 mU urokinase/1 x 10^6 AMs/24 hours, respectively, when not exposed to cigarette smoke and 148, 638, and 40 mU urokinase/1 x 10^6 AMs/24 hours, respectively, after smoke exposure. PA activity in human smokers and nonsmokers was 284 and 232 mU urokinase/5 x 10^5 AMs and 580 and 612 mU urokinase/mg cellular protein in cell lysates, and 2,070 and 1,380 mU urokinase/mg lavage protein in lavage fluids.

86–1069. Cosio, M.G.; Shiner, R.J.; Saetta, M., et al. **Alveolar Fenestrae in Smokers. Relationship With Light Microscopic and Functional Abnormalities.** *American Review of Respiratory Disease* 133(1):126-131, January 1986.

Lungs of 12 smokers were studied with scanning electron microscopy to investigate the distribution and size of alveolar fenestrae and their relationship to the average distance between alveolar walls (Lm) and lung function. Alveolar fenestrae in areas near terminal airways (respiratory bronchioles and alveolar ducts) were consistently larger than fenestrae far from airways (alveoli). Fenestrae in near areas increased in size as Lm increased ($r=0.845$, $p<0.001$), but no correlation between Lm and fenestrae size in far areas was found ($r=0.281$, NS). The overall area of fenestrae correlated significantly with forced expiratory volume in 1 sec ($r=-0.745$, $p<0.01$), maximal midexpiratory flow rate ($r=-0.752$, $p<0.01$), and transpulmonary pressure at 90 percent of total lung capacity ($r=-0.804$, $p<0.05$). However, when subdivided into near and far areas, only fenestrae near the small airways showed a significant correlation with function. Findings suggest that in smokers with mild to moderate emphysema, destruction preferentially affects areas around the terminal airways (near areas) and that these changes might play an important role in lung function. (Auth. Abs.)

86–1070. Costa, D.L.; Kutzman, R.S.; Lehmann, J.R., et al. **Altered Lung Function and Structure in the Rat After Subchronic Exposure to Acrolein.** *American Review of Respiratory Disease* 133(2):286-291, February 1986.

Lung mechanics and diffusion and associated structural correlates were evaluated in groups of 24 male Fischer-344 rats exposed for 12 days (6 hours/day, 5 days/week) to 0, 0.4, 1.4, or 4.0 ppm acrolein, an unsaturated, aliphatic aldehyde present in the vapor phase of cigarette smoke. Exposure to 4.0 ppm acrolein, which resulted in depressed flow—volume curves, leftward shifts of the compliance curve, and enlarged lung volumes, suggested airway obstruction. Airflow dysfunction correlated with presence of focal peribronchial lesions and lung elastin concentrations. In contrast, flow—volume dynamics in rats exposed to 0.4 ppm were significantly enhanced without corresponding lung histologic and compositional changes. Rats exposed to 1.4 ppm acrolein were not functionally different from control animals, but did have infrequent bronchiolar lesions and marginally increased collagen. All exposure groups exhibited increases in the diffusing capacity for carbon monoxide that correlated with lung tissue surface, apparently related to alveolar hyperinflation and possibly lung tissue growth. It is concluded that acrolein produces distinct functional lesions in rat lungs at 0.4 and 4.0 ppm that, when present at an intermediate exposure challenge, appear to sum algebraically and obscure presence of disease. (Auth. Abs. Mod.)

86–1071. Daly, W.J. **COPD. Assessing Functional Status.** *Hospital Practice* 20(3A):73-77, 82-85, 89-93, March 1985.

Although patients with chronic obstructive pulmonary disease (COPD) have lower forced expiratory volume in 1 sec and steeper slope of deterioration than the normal aging population, partial recovery is possible if the abnormality is detected early (before significant loss has occurred). Cessation of smoking may not produce actual improvement, but more normal loss-of-function slope is often restored. COPD patients should be encouraged to stop smoking; tapering off is less successful and merely prolongs the difficulty. Cessation approaches such as psychotherapy, group therapy, or use of nicotine substitutes should be recommended for patients who fail to quit on their own. Patients with COPD often have increased wheezing and dyspnea when exposed to nonspecific bronchial irritants, particularly small particles. Patients who are exposed to industrial or environmental irritants should make every effort to rid their personal environment of particulate matter. In some cases, a change of occupation may be necessary. Radical changes in lifestyle should not be contemplated until the patient has stopped smoking and all other avenues of management have been fully explored. Immunizations (influenza) should be provided annually. A case history is used to discuss symptoms, clinical diagnosis, diagnostic tests, prevention of progression, management of symptoms, intercurrent disorders, and possible need of hospitalization.

86–1072. Ernst, P.; Thomas, D.; Becklake, M.R. **Respiratory Survey of North American Indian Children Living in Proximity to an Aluminum Smelter.** *American Review of Respiratory Disease* 133(2):307-312, February 1986.

Analysis of the effects of smoking on respiration and lung function among 253 North American Indian children aged 11 to 17 years living in a reserve adjacent to an aluminum smelter revealed sex-related differences in symptoms (wheeze and cough). The children, examined for ambient air pollution effects of exposure to particulate and gaseous fluorides, showed no adverse symptoms related to residence near the smelter, with the exception of an increase in closing volume among boys living closest to the smelter. Prevalence of smoking was similar to that of other Canadian adolescents (51.3 percent; 18 percent boys, 33.3 percent girls). Wheezing among smokers was higher among girls (71.4 percent) than among boys (60.9 percent), and higher than among nonsmokers (47.0 percent girls, 44.8 percent boys). Cough was also more more prevalent in girls (28.6 percent) than in boys (13.0 percent) compared with nonsmokers (9.6 percent girls, 6.7 percent boys). Complaints of phlegm in smokers (43.1 percent) were nearly double those of nonsmokers. Symptoms of dyspnea on exertion were more than four times more prevalent in smokers than in nonsmokers. (Auth. Abs. Mod.)

86–1073. Haenig, R. **Die Schadlichkeit des Tabakrauchs. [The Harmfulness of Tobacco Smoke.]** *Therapiewoche* 35(38):4357-4360, September 16, 1985, German.

Cigarette smoke adversely affects lung tissue by (1) changing the morphology of cell membranes and decreasing adhesion between cells; (2) creating an imbalance between oxidants and antioxidants; (3) increasing neutrophil counts and, therefore, elastase formation; (4) inactivating elastase inhibitors; (5) inducing bronchial cell proliferation; (6) increasing mucus production while decreasing mucus transport; and (7) promoting bacterial growth through diminished macrophage phagocytosis. Pretreatment with sulfhydryl compounds significantly increased survival of rats exposed to cigarette smoke constituents. Studies have found that N-acetylcysteine had a protective effect on rat liver and lung cells exposed to cigarette smoke condensate; counteracted the cytotoxic effects of oxidants released by granulocytes; reduced bronchial cell proliferation and the ciliotoxic effects of cigarette smoke; and improved mucociliary clearance in smokers with hypersecretory bronchitis. Impairment of chemotaxis of human granulocytes in vitro by cigarette smoke or some of its constituents was completely or partially antagonized by glutathione and cysteine. A double-blind study of chronic bronchitis patients found a significant decrease of exacerbations in patients treated with N-acetylcysteine (200 mg twice/day): 60 percent of treated patients compared with 81 percent of controls.

86–1074. Hakim, T.S.; King, M.; Wang, C.G., et al. **Effect of Chronic Cigarette Smoke Exposure on Pulmonary Vasomotion in Beagle Dogs.** *Journal of Applied Physiology* 59(6):1815-1822, December 1985.

The left lower lobes from 6 beagle dogs who had smoked cigarettes (50 cigarettes/week for 40 weeks) and from 12 control dogs were perfused in situ to measure the vascular pressure—flow relationship and resistance of the three vascular segments to study chronic cigarette smoke exposure effects on the resistive properties of pulmonary vasculature. In controls, vascular resistance in the arterial, middle, and venous segments was 23, 36, and 41 percent of the total, respectively. Segmental distribution of vascular resistance was not significantly different in the smoke-exposed dogs; however, the absolute value in the arterial and venous segments was 41 and 37 percent less, respectively, in smoke-exposed dogs compared with nonexposed controls ($p < 0.05$). Chronic cigarette smoking reduced basal pulmonary vascular resistance and attenuated the venoconstrictor response to serotonin and methacholine infusion, but potentiated the hypoxic pressor response of the microvessels. Results suggest that following smoke exposure, there was a loss in muscle tone in arteries and veins that was accompanied by increased smooth muscle thickness. Comparison of results in control beagles with those previously observed in mongrel dogs revealed marked differences. (Auth. Abs. Mod.)

86–1075. Hedenstrom, H.; Malmberg, P.; Agarwal, K. **Reference Values for Lung Function Tests in Females. Regression Equations With Smoking Variables.** *Bulletin Europeen Physiopathologie Respiratoire* 21:551-557, 1985.

Prediction formulas for static and dynamic spirometry, gas distribution, static lung mechanics, and transfer test were derived from measurements in 86 healthy female smokers and 100 never smokers. Measurements included total lung capacity, residual volume, airway resistance, static elastic recoil pressure of the lung, static compliance, closing volume, slope of the alveolar plateau (phase 3), flow-volume variables (including mean transit time) during breathing of air or a helium/oxygen mixture, and conventional spirometric indices. For all lung function tests, a single regression equation including time-related smoking variables, valid for both smokers and never smokers, was obtained. In general, the effect of aging (from 20 to 70 years) on lung function test results was larger than the effect of smoking (40 cigarettes/day for 50 years); however, airway resistance, volumic airway conductance, closing volume, phase 3, forced expiratory volume in 1 sec/vital capacity, mean transit time, variance of mean transit time, and volume of isoflow were changed to a proportionally greater extent by smoking than by aging. (Auth. Abs. Mod.)

86–1076. Heller, R.F.; Hayward, D.M.; Farebrother, M.T.B. **Lung Function of Farmers in England and Wales.** *Thorax* 41(2):117-121, February 1986.

Dairy farmers and farmers engaged in silage work had significantly reduced lung function compared with industrial workers in England and Wales. Farmers who smoked heavily (≥ 20 cigarettes/day) had significantly lower forced expiratory volume in 1 sec (FEV_1), FEV percent, forced expiratory flow at 25 to 75 percent of vital capacity ($FEF_{25\text{-}75}$), and $FEF_{75\text{-}85}$. Medical Research Council questionnaires were used to evaluate 428 farmers and farmworkers from 146 farms for chronic bronchitis symptoms. Farmers were generally older, taller, and heavier than controls, were less likely to smoke, and had significantly higher forced vital capacity (FVC). Multiple linear regression analysis showed that farmers had significantly lower FEV_1 and $FEF_{25\text{-}75}$. Age had an independent significant relationship with all five measures of lung function. Height had a positive association with FVC and FEV_1, but a negative association with FEV percent. Farmers working with dairy cattle and silage were the only groups with FEV percent significantly lower than that of controls (dairy, 3 percent; silage workers, 2.1 percent). $FEF_{25\text{-}75}$ for regular dairy workers was also lower. (Auth. Abs. Mod.)

86–1077. Honeybourne, D.; Pickering, C.A.C. **Physiological Evidence That Emphysema Is Not a Feature of Byssinosis.** *Thorax* 41(1):6-11, January 1986.

Emphysema appeared to be related to cigarette smoking and not byssinosis in a 3-year investigation of 153 women (103 smokers, 50 never-smokers) with grades 2 and 3 byssinosis. Detailed lung function tests showed that the 68 heavy smokers (>10 cigarettes/day) had significantly lower forced expiratory volume in 1 sec ($p<0.01$) after correction for age, than nonsmokers. In a subgroup of 89 women who were able to perform the carbon monoxide gas transfer test, significantly lower values were obtained for carbon monoxide transfer factor (TLCO) ($p<0.001$), TLCO percent predicted ($p<0.001$), and transfer coefficient (KCO, $p<0.001$) in heavy smokers than in nonsmokers, even though nonsmokers had worked longer in cotton mills ($p<0.02$). Mean TLCO was significantly lower than predicted in heavy smokers ($p<0.001$) but not in nonsmokers. A significant negative correlation was found between number of cigarettes smoked/day and TLCO ($p<0.01$), TLCO percent predicted ($p<0.001$), and KCO ($p=0.005$), but not with number of years spent in the carding area. Results indicate that long-term exposure to cotton dust does not lead to emphysema. (Auth. Abs. Mod.)

86–1078. Kennedy, S.M.; Walker, D.C.; Belzberg, A.S., et al. **Macrophage Accumulation of Inhaled Gallium-67 Citrate in Normal Lungs.** *Journal of Nuclear Medicine* 26(10):1195-1201, October 1985.

To determine the feasibiity of studying early airway inflammation in smokers with inhaled gallium-67 (^{67}Ga) aerosol, eight smokers and eight nonsmokers breathed a ^{67}Ga aerosol. Imaging was performed immediately and after 24 and 96 hours. Approximately two-thirds of the initial dose remained in the lungs at 24 hours and no difference was seen between groups. Only a very slight decrease was seen in both groups after 96 hours, suggesting that gallium becomes bound to lung tissue or to cells not rapidly removed from the lungs. The mechanism of gallium retention was investigated by performing autoradiography on tissue from two smoke-exposed guinea pigs and two human patients undergoing resection surgery who breathed the gallium aerosol 24 hours prior to tissue removal. Silver grain accumulations were observed only over pulmonary macrophages. It is concluded that it is not feasible to use aerosolized gallium to assess airway inflammation in smokers. (Auth. Abs. Mod.)

86–1079. Kilburn, K.H.; Warshaw, R.; Boylen, C.T., et al. **Pulmonary and Neurobehavioral Effects of Formaldehyde Exposure.** *Archives of Environmental Health* 40(5):254-259, September-October 1985.

Cigarette smokers exposed intermittently to higher doses of formaldehyde (40 ppm in mainstream cigarette smoke) were more tolerant of occupational exposure than nonsmokers, except more of them had reduced small airway flow rates. The few puffs of tenfold higher doses would not raise the total intake very much if the workplace exposure was at 2 to 4 ppm. Two groups of male workers exposed to formaldehyde (also a component of cigarette smoke) were studied for work-related neurobehavioral, respiratory, and dermatological symptoms: 45 workers in phenol-formaldehyde-plastic foam matrix embedding of fiberglass (batt making) and 18 fixing tissues for histology. Batt makers studied across the initial workshift after an extended holiday had average frequencies of combined neurobehavioral, respiratory, and dermatological symptoms of 17.3 for the hot areas and 14.7 for the cold areas of the process, which were significantly greater than the 7.3 average for histology workers and 4.8 for 26 unexposed male hospital workers (controls). During the first workshift after the holiday, 58 percent of batt makers had a decrease in one or more tests of pulmonary function; 9 nonsmokers had decreases more frequently than the 35 smokers. Among the batt makers, 35 percent registered a decline in forced expiratory volume in 1 sec, forced vital capacity, or in diffusing capacity. (Auth. Abs. Mod.)

86–1080. Mullen, J.B.M.; Wiggs, B.R.; Wright, J.L., et al. **Nonspecific Airway Reactivity in Cigarette Smokers. Relationship to Airway Pathology and Baseline Lung Function.** *American Review of Respiratory Disease* 133(1):120-125, January 1986.

Data suggest that cigarette smoking, starting airway caliber, and airway inflammation are associated with nonspecific airway reactivity and that each exerts an independent effect. Inhalation dose—response curves were performed in 40 patients prior to lung surgery to examine the relationship of cigarette smoking, starting airway caliber, and airway pathology to nonspecific airway reactivity. Airway reactivity (PC_{20}) was assessed by the provocative concentration of methacholine ($n=30$) or histamine ($n=10$) resulting in a 20 percent fall in forced expiratory volume in 1 sec. Preoperative measurements were taken of maximal expiratory flow, diffusing capacity, and lung volume. After resection, specimens were graded for small and large airways pathology and emphysema. Patients were divided into four groups: (1) 6 with $PC_{20} \leq 1$ mg/mL, (2) 11 with PC_{20} 1 mg/mL to ≤ 4 mg/mL, (3) 14 with PC_{20} 4 mg/mL to ≤ 16 mg/mL, and (4) 9 with $PC_{20} > 16$ mg/mL. Patients with $PC_{20} \leq 1$ mg/mL had reduced maximal expiratory flow. No differences were observed in measurements of cartilaginous airway disease among the four reactivity groups. Significant independent correlations of cigarette consumption, membranous bronchiole inflammation, and maximal expiratory flow rates to PC_{20} were observed. (Auth. Abs. Mod.)

86–1081. Pearson, M.G.; Chamberlain, M.J.; Morgan, W.K.C., et al. **Regional Deposition of Particles in the Lung During Cigarette Smoking in Humans.** *Journal of Applied Physiology* 59(6):1828-1833, December 1985.

Data from 11 habitual smokers on differences in regional deposition of aerosol particles during cigarette smoking compared with tidal breathing showed that smoking results in greater apical and central deposition than expected from the distribution observed during resting ventilation. An aerosol of technetium-99m-labeled sulfur colloid particles was mixed with cigarette smoke in a special cigarette holder and respiratory patterns during tidal breathing (control) and smoking periods were monitored with a respiratory inductance plethysmograph. All participants had a shift toward more apical deposition during smoking than during tidal ventilation. Five had grossly increased tracheobronchial deposition during smoking that was immediately obvious on gamma camera images. No significant correlations were noted between shifts in deposition (either centrally or apically) and any of the respiratory patterns or indexes, either individually or in combination. The changes in the site of deposition observed during smoking were probably influenced by the properties (size, reactivity, and hygroscopicity) of the particles utilized. (Auth. Abs. Mod.)

86–1082. Shim, C.; Williams, M.H., Jr. **Effect of Odors in Asthma.** *American Journal of Medicine* 80(1):18-22, January 1986.

Some odors appeared to make asthma worse in the 60 patients surveyed: 85 percent claimed a respiratory reaction to insecticides, 78 percent to household cleaning agents, 72 percent to perfume and cologne, 75 percent to cigarette smoke, 73 percent to fresh paint, 60 percent to automobile exhaust or gas fumes, and 37 percent to cooking odors. Among the 45 who were affected by cigarette smoke (10 ex-smokers), most cited heavy smoke-filled rooms and continuous exposure lasting 10 to 30 minutes was sufficient to worsen asthma. Some patients had consistent worsening on exposure to a particular odor, while others claimed to have worsening when their asthma was not well controlled. Usual symptoms on exposure were shortness of breath, tightness of chest, wheezing, and cough. Twenty-six percent had nasal symptoms such as congestion and sneezing. It is suggested that asthmatic response to odors may be a reaction that occurs in the bronchial mucosa, either a direct irritant effect or an immunologic reaction with secondary chemical mediator release or from a local neural reflex. A psychologic component may be an important factor in this reaction.

86–1083. Snider, G.L.; Lucey, E.C.; Stone, P.J. **Animal Models of Emphysema.** *American Review of Respiratory Disease* 133(1):149-169, January 1986.

Information on the association between cigarette smoke and production of emphysema in dogs, rabbits, rats, and hamsters is summarized. With one exception, exposing dogs to cigarette smoke has not resulted in emphysema, although various other physiological changes have occurred. Air-space enlargement and increased connective tissue in alveolar septal tissue were produced in beagle dogs following exposure to cigarette smoke over a period of 2 to 4 months. More severe emphysema was observed in rabbits exposed to cigarette smoke for 2 to 5 years than in nonexposed animals. Smoke-exposed rats and hamsters have developed focal accumulations of pigmented alveolar macrophages, mild focal alveolar epithelial hyperplasia, and mild alveolar wall fibrosis, but not emphysema. Cigarette smoke has been shown to potentiate emphysema induced by porcine pancreatic elastase in hamsters, indicating an important direction for future research. Also reviewed are criteria for animal models of emphysema, emphysema induced by papain and pancreatic elastase, genetic models of emphysema, and the association between emphysema and neutrophil elastase, macrophages, platelets, oxidants, irritant gases, air-space enlargement with fibrosis, and lathyritic agents and malnutrition.

86–1084. Stockley, R.A.; Shaw, J.; Whitfield, A.G.W., et al. **Effect of Cigarette Smoking, Pulmonary Inflammation, and Lung Disease on Concentrations of Carcinoembryonic Antigen in Serum and Secretions.** *Thorax* 41(1):17-24, January 1986.

Serum carcinoembryonic antigen concentrations were higher in healthy smokers and patients with chronic obstructive bronchitis than in healthy nonsmokers ($p<0.01$), on the basis of specific radioimmunoassay results. Corticosteroid treatment reduced the concentration in nine patients with bronchitis ($p<0.05$). Other inflammatory lung diseases (bronchiectasis, pneumonia, fibrosing alveolitis) were not associated with raised serum carcinoembryonic antigen concentration. Sputum concentrations were about 100 times higher than serum concentrations, and a positive correlation ($r=0.6112$, $p<0.01$) existed between concentrations in sputum and in serum in patients with bronchitis. No preferential rise in sputum concentration was found in current smokers or patients with lung cancer. However, a higher ratio of carcinoembryonic antigen to albumin concentration ($p<0.05$) was found in lavage fluid obtained from the tumor site than in fluid from the normal lung in the same patients, suggesting an increase in carcinoembryonic antigen secretion in the tumor vicinity. Despite this local effect, sputum concentration does not appear to be a useful marker of lung cancer and could not be used as a screening test. (Auth. Abs. Mod.)

86–1085. Watters, L.C.; King, T.E.; Cherniack, R.M., et al. **Bronchoalveolar Lavage Fluid Neutrophils Increase After Corticosteroid Therapy in Smokers With Idiopathic Pulmonary Fibrosis.** *American Review of Respiratory Disease* 133(1):104-109, January 1986.

Data indicate that cigarette smoking and corticosteroid therapy influence bronchoalveolar lavage fluid (BALF) neutrophil content in patients with idiopathic pulmonary fibrosis (IPF). The question whether changes in neutrophil content in patients with IPF are different for smokers and nonsmokers after treatment with corticosteroids was investigated in 18 IPF patients (10 smokers, 8 nonsmokers), 14 of whom were treated orally with prednisone (6 smokers, 8 nonsmokers). Histologic assessment of alveolar inflammation and inflammatory small airways disease did not differ between smokers and nonsmokers. No smoker treated with prednisone had pathologic evidence of emphysema in addition to IPF. Five of six smokers showed an increase in BALF neutrophils after 3 months of prednisone treatment ($p<0.05$); BALF neutrophils decreased or remained unchanged in nonsmokers. The increase among smokers was associated with subsequent clinical improvement after therapy. Results also suggest that interval changes in BALF neutrophil content may not reflect the status of the inflammatory process or structural derangements in the lungs of some patients with IPF. (Auth. Abs. Mod.)

86–1086. Woodman, G.; Newman, S.P.; Pavia, D., et al. **Calibration and Measurement of the Inhaled Smoke Volume in Cigarette Smoking.** *Clinical Physics and Physiological Measurements* 6(3):251-255, August 1985.

The technique described accurately measures the volume of cigarette smoke taken into the lung field regardless of speed, initial lung volume, and depth of inhalation. Calibration of inhaled smoke volume is considered to be a more useful index of smoke exposure than volume of smoke drawn into the mouth. The radiotracer technique utilizes a single-probe scintillation counter collimated to view the entire lung field. To detect the radiotracer in the chest, the subject sits in front of the scintillation counter and inhales a bolus of $^{81}\mathrm{Kr}^{m}$ from the cigarette chamber into his lungs, and an electronic two-way valve calibrates the amount of radioactivity detected in the chest. Differences between volume of puffs recorded by a smoking analyzer and from volume calculated from the radiotracer technique are tabulated. Volume of puffs taken from the chamber ranged from approximately 15 to 90 mL, the difference between the two measurements being at most 5 mL for largest puff volume. Difference in means of the corrected maximal count rate for fast and slow inhalations was less than 2 percent. Changes in initial lung volume and depth of inhalation yielded a maximum variation of less than 1.5 percent. In clinical studies, the apparatus was found to be simple to operate and easy to use.

86–1087. Zober, A.; Weltle, D. **Cross-Sectional Study of Respiratory Effects of Arc Welding.** *Journal of the Society of Occupational Medicine* 35(3):79-84, Autumn 1985.

The stress and strain concept of modern occupational medicine was used to describe the dose of welding fumes (stress) to which a group of 305 welders (174 smokers, 56 ex-smokers, 75 nonsmokers) was exposed and the recorded reactions (strain), primarily of the respiratory system, to exposure. Controls, 100 workers of similar age and smoking habits (57 smokers, 20 ex-smokers, and 23 nonsmokers), were from various industrial complexes. Exposure to welding fumes and gases did not appear to be related to any increase in bronchopulmonary diseases studied; however, an observed excess of rhonchi in older welders who smoke suggests a combined deleterious effect of smoking and welding fumes. Age and smoking habits, but not welding, were the statistically significant factors governing incidence of chronic bronchitis. In addition, determination of forced mid-expiratory flow found that pathological values were seen significantly more often in smokers than in nonsmokers among both welders and controls. Arc welders should be instructed about the possible adverse effects of inhaling welding fumes and should be motivated to refrain from smoking.

See also. **86–1217, 86–1220, 86–1226, 86–1231, 86–1237**

CARDIOVASCULAR DISEASES

86–1088. Arnesen, E.; Forsdahl, A. **The Tromso Heart Study: Coronary Risk Factors and Their Association With Living Conditions During Childhood.** *Journal of Epidemiology and Community Health* 39(3):210-214, September 1985.

Poverty during childhood followed by a high standard of living was found to contribute to coronary heart disease risk factors in the Tromso (Norway) heart study. Poverty was positively associated with age-adjusted levels ($p<0.05$) of total cholesterol and percentage of current smokers (men only) and negatively associated with body height. When cholesterol was adjusted for age, body mass index, leisure time physical activity, coffee and alcohol consumption, and cigarette smoking, there was a significant linear trend in women ($p\leq 0.0001$) but not in men ($p=0.224$). In analysis of Tromso county residents only (to establish a more homogeneous population), the linear trend was also significant ($p=0.011$) for men. The study, conducted in 1979 and 1980, surveyed 14,652 residents (7,405 men born between 1925 and 1959 and 7,247 women born between 1930 and 1959). (Auth. Abs. Mod.)

86–1089. Burkart, F. **Die Myokardinfarkt- und Reinfarktprophylaxe. [Primary and Secondary Prophylaxis in Myocardial Infarction.]** *Therapeutische Umschau Revue Therapeutique* 42(8):511-520, 1985, German.

Over the last decade, studies have shown the benefits of treating hypertension and hypercholesterolemia and of abolishing smoking in the primary and secondary prevention of coronary heart disease. Mortality among hypertensive smokers is almost twice that of hypertensive nonsmokers. Smoking stimulates epinephrine secretion, which increases heart action, and decreases oxygen supply through carbon monoxide inhalation. Observed decreases in infarction rates among ex-smokers suggest that smoking has a chronic effect on coronary arteries. In addition, coffee consumption combined with smoking has a negative influence on lipid levels that is thought to contribute to atherogenesis. Coffee consumption alone has no effect on low or high density lipoprotein levels. Incidence of reinfarction among patients who continue to smoke is twice as high as among patients who stop smoking after initial infarction. It has also been found that diabetes mellitus, obesity, and physical inactivity indirectly influence risk of myocardial infarction.

86–1090. Dionyssiou-Asteriou, A.; Kalofoutis, A. **Lipid Levels in High Density Lipoprotein Subfractions in Smokers With Peripheral Vascular Disease.** *Atherosclerosis* 57(2-3):343-346, November 1985.

Smokers with peripheral vascular disease (PVD) had higher levels of total cholesterol and triglycerides than healthy smokers. Significant differences were observed in concentration of triglycerides ($p<0.0001$), cholesterol ($p<0.0001$), and phospholipids ($p<0.05$) and in the sum of atherogenic very low density lipoprotein (VLDL) and low density lipoprotein (LDL) cholesterol ($p<0.001$). Patients (50 smokers with established PVD, 46 to 62 years of age) were compared with 30 healthy smokers. Patients and controls were not on any lipid-lowering drug, smoked a minimum of 20 cigarettes/day, and consumed moderate quantities of alcohol (300 mL of wine or 500 mL of beer/day). All refrained from alcohol consumption 48 to 72 hours before venepuncture. HDL cholesterol levels did not differ between patients with PVD and controls. Ratios of serum cholesterol/serum triglycerides and of HDL cholesterol/VLDL and LDL cholesterol combined were significantly different ($p<0.0001$ and $p<0.01$, respectively).

86–1091. Gordon, T.; Doyle, J.T. **Alcohol Consumption and Its Relationship to Smoking, Weight, Blood Pressure, and Blood Lipids. The Albany Study.** *Archives of Internal Medicine* 146(2):262-265, February 1986.

In the Albany cardiovascular study of 1,910 employed men, 84.7 percent of those who drank ≥ 90 ounces of alcohol/month also consumed the highest number of cigarettes/day (24.1). These men also had higher blood pressure and high density lipoprotein (HDL) cholesterol concentrations than men who drank less alcohol. After 18 years of followup, survivors consumed twice as much alcohol (on average) as at entry, weighed slightly more, and had substantially higher blood pressures. Former heavy drinkers who had quit, however, lost weight and had less than average increases in blood pressure. At entry, 58 percent of all the men smoked cigarettes, but levels of use varied with drinking habits. Only 45 percent of nondrinkers smoked. The percentage of smokers decreased over the 18 years, but there was no significant correlation between changes in drinking and smoking habits, despite the cross-sectional association between the two habits. Changes in drinking habits were similar among men who quit smoking and continuing smokers. Cigarette use was associated with lower HDL cholesterol levels, even though cigarette smokers were leaner and drank more (on average) than nonsmokers and therefore might be expected to have higher levels. Multivariate analysis indicates that the positive relationship of HDL cholesterol with alcohol use and the negative relation of HDL cholesterol with relative weight and cigarette use are statistically significant. (Auth. Abs. Mod.)

86–1092. Gotto, A.M., Jr. **Interactions of the Major Risk Factors for Coronary Heart Disease.** *American Journal of Medicine* 80(2A):48-55, February 1986.

Cardiovascular diseases account for more than 50 percent of deaths in the United States and remain the Nation's leading killer. Coronary disease mortality is 70 percent higher in smokers than in nonsmokers and is two to three times higher in heavy smokers. The risk is even higher in hypertensive and hypercholesterolemic smokers. Although treatment of hypertension has been beneficial in reducing morbidity and mortality from cardiovascular diseases, smoking is generally accepted as the single most preventable cause of death from coronary heart disease in the United States. Smoking acts synergistically with hypertension and hypercholesterolemia. Recent studies have shown that lowering cholesterol through diet or drugs can reduce progression of atherosclerotic plaque. Means are now available for reducing cholesterol, low density lipoprotein, and blood pressure in the general population and for identifying persons who are at high risk. Avoiding tobacco, reducing dietary fat, controlling blood pressure, exercising, and maintaining an ideal body weight provide the best overall strategy for battling cardiovascular diseases.

86–1093. International Prospective Primary Prevention Study in Hypertension Group. **Cardiovascular Risk and Risk Factors in a Randomized Trial of Treatment Based on the Beta-Blocker Oxprenolol: The International Prospective Primary Prevention Study in Hypertension (IPPPSH).** *Journal of Hypertension* 3(4):379-391, August 1985.

In 6,357 men and women aged 40 to 64 years with uncomplicated essential hypertension (diastolic blood pressures 100 to 125 mm Hg), smokers were less likely to benefit from beta-blocker therapy than nonsmokers. The 3,185 patients who received oxprenolol and the 3,172 treated with placebo were followed up for 3 to 5 years. Supplementary drugs, excluding beta-blockers, were used as necessary in both groups to reduce diastolic pressure to 95 mm Hg or less. Oxprenolol therapy significantly lowered blood pressures, normalized ECG earlier, and was associated with less hypokalemia and fewer withdrawals from double-blind treatment for uncontrolled hypertension. Sudden death (relative risk (RR) 1.08), myocardial infarction (RR 0.83), and cerebrovascular accident (RR 0.97) rates were similar in both groups. However, cardiac and cerebrovascular events were doubled in smokers. The expected benefit of oxprenolol was seen in nonsmokers, among whom the cardiac event rate was half that of nonsmokers in the placebo group. (Auth. Abs. Mod.)

86–1094. Misjaviciene, I.S.; Baubiniene, A.V.; Grabauskas, V.I., et al. **Relationship Between Risk Factors and Ischaemic Heart Disease Mortality in a Representative Sample of Men Aged 45-59 Years in Kaunas.** *Cor et Vasa* 27(4):236-242, 1985.

Smoking was an important risk factor for ischemic heart disease (IHD) mortality in a representative sample of men aged 45 to 59, on the basis of results of a 7-year followup of 3,553 subjects examined initially in the Kaunas-Rotterdam intervention study. The main cause of death was cardiovascular disease (38.7 percent); 62 percent of these were IHD cases. The relationship between systolic and diastolic hypertension, hypercholesterolemia, smoking, impaired glucose tolerance, and mortality as a result of IHD was investigated in 2,392 men who were examined and divided into (1) 405 who showed one or several associated forms of IHD, and (2) 1,987 without IHD at screening. The most unfavorable prognostic factors were smoking in men found healthy at the screening examination and hypertension in men with IHD. Smoking was the most prevalent risk factor (43.5 percent) in those who later died of IHD, followed by arterial hypertension (29.6 percent), hypercholesterolemia (24.4 percent), and impaired glucose tolerance (21.5 percent). It is suggested that preventive care should concentrate on prevention of smoking and reduction of elevated blood pressure.

86–1095. Ockene, J.K.; Hosmer, D.; Rippe, J., et al. **Factors Affecting Cigarette Smoking Status in Patients With Ischemic Heart Disease.** *Journal of Chronic Diseases* 38(12):985-994, 1985.

Smoking behavior and factors affecting behavior are reported for 200 patients hospitalized for ischemic heart disease (IHD), including 96 patients with a first manifestation (either myocardial infarction or angina) and 104 who were experiencing a recurrent event. There were significantly more current smokers in the initial event group than in the recurrent event group (55 percent vs. 34 percent); however, there were significantly more ex-smokers in the recurrent event group than in the initial event group (44 percent vs. 27 percent). Increasing age also significantly discriminated ex-smokers from current smokers. Among patients with a recurrent event, ex-smokers and current smokers differed significantly with respect to age, education, occupation, negative attitudes toward smoking, and peak number of cigarettes smoked when smoking the heaviest. Other variables measured included personal adjustment, health locus of control, depression, anxiety, smoking environment, health habits, and sex. Two models were developed that were able to correctly classify 61.7 and 69.1 percent of the patients with regard to smoking status. (Auth. Abs. Mod.)

86–1096. Ockene, J.K.; Hulley, S.B.; Gerace, T.A. **Smoking Behavior Change Patterns in the Multiple Risk Factor**

Intervention Trial (MRFIT) and Their Relationship to Mortality From Coronary Heart Disease (CHD). In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 403-414.

The Multiple Risk Factor Intervention Trial (MRFIT), which used a broad spectrum of group and individual smoking cessation techniques and a strong followup protocol, was effective in promoting cessation of smoking and maintenance of changed behavior. The National Institutes of Health program included men aged 35 to 57 years at high risk of coronary heart disease (CHD) but free of overt CHD on entry. The primary objective of MRFIT was to determine whether reduction of high blood pressure and blood cholesterol and cessation of smoking would result in a significant reduction in CHD mortality. After the trial, each participant was followed up for at least 6 years, at which time 43 percent of special intervention smokers and 28 percent of usual care smokers reported cessation, establishing unprecedented long-term rates. Cessation was inversely related to baseline level of cigarette smoking (i.e., the majority of quitters were light smokers rather than heavy smokers). Approximately 25 percent of special intervention smokers and 7 percent of usual care smokers stopped smoking by the end of the first year and remained abstinent through the sixth annual examination. Analysis of long-term quitters is especially important when considering smoking behavior change and its impact on mortality. (Auth. Abs. Mod.)

86–1097. Pennell, R.C.; Hollier, L.H.; Lie, J.T., et al. **Inflammatory Abdominal Aortic Aneurysms: A Thirty-Year Review.** *Journal of Vascular Surgery* 2(6):859-869, November 1985.

Smoking was a risk factor for inflammatory abdominal aortic aneurysm (AAA) in a 30-year review of 2,816 patients who underwent repair for AAA. Inflammatory aortic or iliac aneurysms were present in 127 patients (123 men and 4 women), most of whom were heavy smokers (92.1 percent). Hypertension was present in nearly 50 percent of all patients. Clinical evidence of peripheral arterial occlusive disease and coronary artery disease was found in 26.6 and 39.4 percent, respectively. Additional aneurysms occurred in 50 percent of patients. Iliac aneurysms were seen in 55 patients, thoracic or thoracoabdominal in 17, femoral in 16, and popliteal aneurysms in 10. Compared with patients who have ordinary atherosclerotic aneurysms, patients with inflammatory aneurysms are significantly more likely to have (1) elevated erythrocyte sedimentation rate (73 vs. 33 percent, $p < 0.0001$); (2) weight loss (20.5 vs. 10 percent, $p < 0.05$); (3) symptoms (66 vs. 20 percent, $p < 0.0001$); and (4) increased operative mortality rate (7.9 vs. 2.4 percent, $p < 0.002$). (Auth. Abs. Mod.)

86–1098. Perkins, K.A. **The Synergistic Effect of Smoking and Serum Cholesterol on Coronary Heart Disease.** *Health Psychology* 4(4):337-360, 1985.

Evidence of a synergistic interaction effect of smoking and elevated serum cholesterol on coronary heart disease (CHD) morbidity and mortality is examined to help explain the variance in determining which smokers will and which will not suffer from CHD. Evidence is also presented to support the notion that, in part, smoking and serum cholesterol are indexes of a behavioral risk factor. A synergistic interaction between smoking and elevated serum cholesterol is determined to exist, although improvements in methodology are needed to more clearly identify its magnitude. It is suggested that behavioral treatments aimed at smoking cessation and dietary modification should be focused specifically on the more than 25 million young and middle-aged Americans who smoke and have elevated serum cholesterol levels. In this way, such treatments may increase their effectiveness in lowering the risk of CHD (benefit) without necessarily increasing their effort (cost). (Auth. Abs. Mod.)

86–1099. Petkevicius, R.V.; Grinkeviciene, O.K.; Bojarkskas, J.L., et al. **Preventive Study of Atherosclerosis and Ischaemic Heart Disease Risk Factors Among Kaunas School-Children.** *Cor et Vasa* 27(4):229-235, 1985.

Cardiovascular disease risk factors (smoking, elevated blood pressure, overweight, and reduced physical activity) among schoolchildren aged 10 to 15 years suggest that early detection may be required to prevent arteriosclerosis and ischemic heart disease (IHD) in later life. A 3-year followup of 1,216 schoolchildren and their parents who received intensive health education found significant decreases in smoking and obesity and an increase in physical activity. Among males, 78.6 percent in the preventive group and 50 percent in the control group had stopped smoking ($p < 0.05$). The prevention program consisted of (1) letters informing parents of risk factors and consequences; (2) recommendations for reducing risk factors; (3) personal attention to children with risk factors; (4) organized group discussions with schoolchildren; (5) lectures on the harmful effects of smoking and benefits of an improved lifestyle; (6) poster competitions on harmfulness of smoking; (7) physical exercise regimens for obese children; and (8) lectures for parents of high risk children.

86–1100. Piascik, M.T.; Champney, R.B.; Kasarskis, E.J., et al. **A Method for Enriching the Cadmium Content of Cigarette Smoke and Effect of Exposure to This Smoke on Coronary Vascular Reactivity in the Rat.** *Toxicology and Applied Pharmacology* 81(3, Part 1):525-532, December 1985.

A method developed for varying the cadmium content in the smoke of Kentucky 2R1 reference cigarettes was utilized to study the effect of smoke-borne cadmium on the cardiovascular system. Male Sprague-Dawley rats were exposed for 5 or 23 weeks to smoke from 2R1 reference cigarettes (0.23 μg cadmium/cigarette) and cigarettes prepared from 2R1 tobacco that was treated with 500 μmol cadmium sulfate (2.38 μg cadmium/cigarette). After 5 weeks of exposure, kidney cadmium and coronary vascular reactivity to angiotensin were not altered in either smoke-exposed group compared with cage controls or sham-smoked animals. After 23 weeks of exposure, cadmium levels in kidneys from animals exposed to cadmium-enriched smoke were significantly greater than quantities observed in any other group. Exposure to either type of cigarette smoke increased coronary vascular reactivity above that in either control group. Exposure to cadmium-enriched cigarette smoke increased coronary vascular reactivity to angiotensin above the amount observed following 2R1 cigarette smoke exposure, indicating that smoke-borne cadmium may mediate the observed increases in coronary vascular reactivity following exposure to cigarette smoke. (Auth. Abs. Mod.)

86–1101. Rudnicki, S.; Wojtkowska, E.; Slipko, Z. **Zachowanie Sie Wybranych Czynnikow Zagrozenia u Chorych z Zawalem Serca w Przebiegu 10-Letniej Obserwacji. [Some Risk Factors Studies of Patients With Cardiac Infarction in Course of Ten-Year Observation.]** *Kardiologia Polska* 28(2):125-133, 1985, Polish.

Smoking, hypertension, diet, overweight, and physical activity were studied as risk factors in cardiac infarction patients, stratified into (1) group 1, controlled ambulatory rehabilitation training; (2) group 2, uncontrolled ambulatory training; and (3) group 3, a control group). Over a 10-year period, 28.3 percent of the 148 patients died. In group 3, 23.5 percent incurred a second cardiac infarction compared with 15.5 and 2.7 percent in groups 1 and 2, respectively. Of 77 remaining patients, only 6 (7.8 percent) were nonsmokers at the start of the program. After 1 year, 46 (59.7 percent) quit smoking (25 in group 1, 15 in group 2, and 6 in group 3. During years 4 through 7, the number of quitters increased. During year 8, a significant number of patients in all three groups began abstaining from the physical training regimen. At the end of the study, 40.4 percent of controlled training, 31.5 percent of uncontrolled training, and 27.3 percent of control groups remained smokers. It is noted that the socioeconomic crisis that occurred in Poland during years 9 and 10 of the study had significant impact as a risk factor of recurrent myocardial infarction.

86–1102. Scott, R.R.; Lamparski, D. **Variables Related to Long-Term Smoking Status Following Cardiac Events.** *Addictive Behaviors* 10:257-264, 1985.

Although abstinence rates for smokers following myocardial infarction (MI) or coronary artery bypass graft (CABG) surgery are far superior to those for people attending formal cessation programs, results indicate only a 29 percent abstinence rate using alveolar carbon monoxide (CO) levels for verification. Of 79 patients, only 26 (33 percent) stopped smoking, indicating that MI and CABG patients may not be more successful at long-term smoking cessation than the general population. Only 29 percent had CO levels of ≤ 8 ppm, and three patients who had discrepant self reports had CO levels ranging from 11.5 to 29 ppm. While smokers and ex-smokers did not differ significantly in cardiac event history (i.e., type of event, number of events), 70 percent of abstinent patients reported quitting immediately after the first cardiac event. Only 13 percent quit after a subsequent event, and 17 percent reported that they quit for health reasons other than cardiac problems. The widely accepted assumption that patients who experience life-threatening cardiac events are substantially more motivated to maintain long-term smoking cessation may be unfounded, and special treatment efforts may need to be directed toward this group.

86–1103. Shaper, A.G.; Pocock, S.J.; Walker, M., et al. **Risk Factors for Ischaemic Heart Disease: The Prospective Phase of the British Regional Heart Study.** *Journal of Epidemiology and Community Health* 39(3):197-209, September 1985.

Cigarette smoking, serum total cholesterol, and blood pressure were highly significant independent risk factors of ischemic heart disease in a prospective study of 7,735 men aged 40 to 59. After followup of 4.2 years (mean), 202 men had experienced acute myocardial infarction (MI) or sudden death attributed to ischemic heart disease. Definite MI on electrocardiogram and recall of doctor diagnosis of ischemic heart disease remained predictive of subsequent major ischemic heart disease, after allowing for all other risk factors. Overweight and above average levels of HDL cholesterol and serum triglycerides were not predictive of risk after allowing for these factors. Men who had never smoked clearly had reduced risk relative to other categories. Of 202 cases, 108 (53 percent) were current smokers and 76 (38 percent) were ex-smokers. No dose—response relationship was found between number of cigarettes smoked and risk of ischemic heart disease. Risk in men aged 55 to 59 years was more than four times that of men aged 40 to 44 years. Of 81 fatalities, 45 died less than 1 hour after onset of symptoms. (Auth. Abs. Mod.)

86–1104. Shennan, N.M.; Seed, M.; Wynn, V. **Variation in Serum Lipid and Lipoprotein Levels Associated With Changes in Smoking Behavior in Non-Obese Caucasian Males.** *Atherosclerosis* 58(1/3):17-25, December 1985.

High density lipoprotein (HDL) cholesterol and the HDL$_2$ subfraction were significantly higher in nonsmokers than in smokers among healthy male Caucasians analyzed for variations among (1) current smokers compared with nonsmokers and (2) ex-smokers compared with earlier values as smokers (minimum 12 months since cessation). In ex-smokers, levels increased with length of time since quitting until levels were similar to those in nonsmokers. A similar increase was observed for weight, although both triglyceride and very low density lipoprotein (VLDL) levels decreased. Low density lipoprotein (LDL) levels showed no significant variation in any comparisons. Changes in triglyceride and VLDL were attributed partially to lower alcohol consumption in both ex-smokers and nonsmokers, although the same observation is contrary to effects observed for both HDL and HDL$_2$. (Auth. Abs. Mod.)

86-1105. Silman, A.; Loysen, E.; De Graaf, W., et al. **High Dietary Fat Intake and Cigarette Smoking as Risk Factors for Ischaemic Heart Disease in Bangladeshi Male Immigrants in East London.** *Journal of Epidemiology and Community Health* 39:301-303, 1985.

Heavy smoking and high dietary fat intake among middle-aged Bangladeshi men living in East London were risk factors for ischemic heart disease. Results showed that the men were 50 percent more likely to be smokers than Caucasians, after adjusting for age and social class. However, very high fat intake (>200 g/day) was twice the national average and accounted for nearly 60 percent of total energy intake. Much of the dietary fat was from vegetable oil, and the ratio of polyunsaturated to saturated fatty acids exceeded the accepted recommended minimum. There were 88 current smokers (75.9 percent) among the 116 Bangladeshi men interviewed compared with 91 (43.1 percent) among 211 Caucasians. Despite the narrow age range, the Bangladeshi men tended to be younger and have a less favorable social class distribution. After adjustment for these two possible confounding variables, there was still an excess of about 50 percent in the number of Bangladeshi smokers (58.9 expected, 88 observed, $p<0.001$). (Auth. Abs. Mod.)

86-1106. Simic, L.; Pirnat, L. **Immunological Aspects of Smoking in Patients With Thromboangitis Obliterans.** *Vasa* 14(4):349-352, 1985.

Cutaneous hypersensitivity to tobacco, presence of serum antinuclear antibodies, quantitative analysis of serum immunoglobulins, and cellular immunity were determined in 100 patients with thromboangiitis obliterans and 130 controls to determine the role of immunological responses to smoking in the etiology of thromboangiitis obliterans. Positive allergic skin responses to nicotine and tobacco extract were similar in patients (50 smokers and 50 ex-smokers), but were higher in patients who smoked than in any of the controls (65 smokers and 65 nonsmokers). Patients with active disease who were steady smokers had antinuclear antibodies in sera, indicating increased production of specific circulating antibodies. Decreased immunoglobulin G levels were also found in patients who smoked. Smoking is one factor that increases the general immunological responsiveness of the body by stimulating antibody production in patients with thromboangiitis obliterans. It is suggested that smoking is a factor in thromboangiitis obliterans etiology and that research should be continued.

86-1107. Siscovick, D.S.; Weiss, N.S.; Fox, N. **Moderate Alcohol Consumption and Primary Cardiac Arrest.** *American Journal of Epidemiology* 123(3):499-503, March 1986.

Current smoking was associated with a relative risk (RR) of 2.71 for primary cardiac arrest after adjustment for alcohol consumption, exercise, and hypertension in 152 patients (25 to 75 years of age) who had had a primary cardiac arrest over a 14-month period in King County, Washington State. Information on risk factors, with emphasis on alcohol consumption, was obtained from spouses of patients and on 152 demographically similar residents of King County. After adjustment for the other factors, light to moderate alcohol consumption was associated with reduced risk of primary cardiac arrest. Compared with persons who were nondrinkers (<1 drink/month), estimated RR was 0.7 for light drinkers (≥ 1 drink/month but <1 drink/day) and 0.5 for moderate drinkers (1 to 3 drinks/day). Estimated RR for those with a history of regular vigorous exercise or a history of hypertension, after controlling for other factors, was 0.42 and 3.73, respectively. Data are consistent with the hypothesis that light to moderate alcohol consumption reduces the risk of primary cardiac arrest. (Auth. Abs. Mod.)

86-1108. Stamler, J.; Wentworth, D.; Neaton, J.D. **Prevalence and Prognostic Significance of Hypercholesterolemia in Men With Hypertension.** *American Journal of Medicine* 80(2A):33-39, February 1986.

Serum cholesterol level of ≥ 182 mg/dL in hypertensive middle-aged men was related to coronary heart disease risk, and cigarette smoking at least doubled the mortality rate at each serum cholesterol level. Six-year followup data on 361,662 men aged 35 to 57 years was evaluated to assess the impact of serum cholesterol level on risk of fatal coronary heart disease for men with high blood pressure. Baseline mean diastolic blood pressure was ≥ 90 mm Hg in 100,032 of the men. For hypertensive men, overall age-adjusted 6-year coronary heart disease mortality was 79 percent higher than for men with diastolic blood pressure <90 mm Hg. Compared with men with diastolic blood pressure <90 mm Hg and serum cholesterol <182 mg/dL, men with diastolic blood pressure ≥ 90 mm Hg had the following relative risk (RR), based on serum cholesterol level: 182 mg/dL, RR 1.64; 182 to 202 mg/dL, RR 2.14; 203 to 220 mg/dL, RR 3.14; 221 to 244 mg/dL, RR 3.29; >245 mg/dL, RR 5.14. Findings suggest that treatment for hypertensive people must be comprehensive and not limited to measures for controlling high blood pressure. Hypertensive smokers should be counseled to give up tobacco and to improve dietary habits. Serum cholesterol should be maintained at optimum levels through long-term care.

86-1109. Uusitupa, M.; Siitonen, O.; Pyorala, K., et al. **The Relationship of Cardiovascular Risk Factors to the Prevalence of Coronary Heart Disease in Newly Diagnosed Type 2 (Non-Insulin-Dependent) Diabetes.** *Diabetologia* 28(9):653-659, September 1985.

The relationship of coronary heart disease (CHD) risk factors (e.g., smoking, age, hypertension, hypercholesterolemia) to the prevalence of CHD was examined in 133 newly diagnosed Type 2 (non-insulin-dependent) diabetic patients (70 men, 63 women) aged from 45 to 64 years and in 144 randomly selected nondiabetic controls (62 men, 82 women) matched for age. Among diabetics, 24 percent of men and 9 percent of women were smokers; among controls, 18 percent and 6 percent, respectively, were current smokers. Prevalence of CHD in diabetic patients was more than three times as high as in nondiabetics. In separate multiple logistic analyses, diabetes showed an independent, significant association to CHD in both sexes. In addition, smoking and high 2-hour postglucose serum insulin level showed a significant association to CHD in women; age and hypertension showed a borderline association in men. (Auth. Abs. Mod.)

86–1110. Wynder, E.L. **Preventing Disease. (Letter).** *Journal of the American Medical Association* 255(8):1017, February 1986.

Although smoking has long been known to be a major risk factor for disease, one of the authors of a 1950 article on the relationship between lung cancer and smoking (reprinted in *Journal of the American Medical Association* 253(20):2986-2994, May 24-31, 1985) notes that another major lifestyle risk factor of cardiovascular disease that gets relatively little support from the medical profession is fat in the daily diet. The National Institute of Health has reported that dietary fat is linked with a variety of cancers (colon and breast cancer, in particular). Physicians need to become directly involved in identifying people at high risk and should provide counseling. It is time that nutrition was taken seriously. Advising patients on smoking and nutrition may not be economically rewarding, but it is good medicine. Preventive strategies for cardiovascular disease and many types of cancer and other chronic diseases, such as emphysema and adult-onset diabetes, are medically feasible and fiscally desirable. Physicians must take the lead in prevention, as has been done by the American Health Foundation, which has a broad-based program for the prevention and cessation of smoking. See also 85-1706.

See also, **86–1074, 86–1164, 86–1176**

PREGNANCY AND INFANT HEALTH

86–1111. Al-Hachim, G.M.; Mahmoud, F.A. **Prenatal Nicotine and CNS Development.** *Epilepsia* 26(6):661-665, November-December 1985.

Nicotine effects in mice studied during different trimesters of pregnancy showed that prenatal nicotine exposure prolonged latency and delayed onset and extinction of audiogenic seizures (AGS) in offspring. Effects were more pronounced during the third trimester and particularly with the largest dose, indicating that prenatal nicotine may delay postnatal development of the central nervous system if administered late in the pregnancy. Three groups of pregnant albino Swiss mice were used for each trimester. Daily doses of nicotine base used were equivalent to 10 (900 µg/kg) or 20 (1,800 µg/kg) cigarettes. Control groups received normal saline. It was concluded that, in the first trimester, the indirect action of nicotine on incidence of AGS in offspring is the major cause of reported changes in AGS parameters, but during the second and third trimesters, nicotine's indirect and/or direct actions might be important causes. (Auth. Abs. Mod.)

86–1112. Bennett, C.A.; McIlwaine, G. **Health Awareness and Practices of Primigravidae in Glasgow.** *Health Bulletin* 43(5):228-232, September 1985.

Smoking ranked highest, followed by diet and alcohol and drug use as health practices influencing pregnancy among the 53 primigravidae women interviewed. The study of health practices prior to and during early pregnancy found that 32 women (60 percent) had been cigarette smokers just prior to pregnancy. Of these, 21 reduced consumption and 5 reported complete cessation after conception. When awareness was related to practices, it was found that 28 of 32 smokers and 9 of 20 nonsmokers were aware of the harmfulness of smoking when questioned indirectly about health practices relating to pregnancy outcome, 49 were aware that practices during pregnancy could influence fetal health, and 12 were aware that practices prior to pregnancy could influence outcome. Decreasing use of drugs, alcohol, and smoking among light and heavy users were all greater than for increasing fruit and vegetable intake. Smoking rates were significantly higher in social classes 4 and 5 than in 1 and 2, both prior to and during early pregnancy. Paired analyses showed that those ranking higher in numbers of cigarettes smoked ranked significantly lower in intakes of vitamin C and folate-rich foods. No significant differences were reported in alcohol or drug use among social classes.

86–1113. Burch, P.R.J. **Maternal Cigarette Smoking and the Ghost of Yerushalmy—Will it Ever Rest? (Letter).** *Journal of the American Medical Association* 255(8):1019, February 1986.

The divergent results of two similarly designed intervention trials of antismoking advice during pregnancy (*British Journal of Preventive and Social Medicine* 31(1):6-12, March 1977; *Journal of the American Medical Association* 251(7):911-915, February 17, 1984) are discussed. It is suggested that the best available estimate of effects of antismoking advice during pregnancy is obtained by combining results from the two trials. When an overall mean, and variance about that mean, was calculated for the combined control and combined treatment groups, it was still not possible to dismiss the hypothesis that a change during pregnancy in factors other than smoking, such as diet, caused higher birth weights in the intervention group. It may be that smokers as a group differ constitutionally from nonsmokers and tend to have babies of lower than average weight, as suggested in an earlier study (*American Journal of Epidemiology* 93(6):443-456, June 1971). It is likely that the ghost of Yerushalmy will continue to haunt us for some time. See also 71-0695, 77-0844, 84-0845.

86–1114. Coles, C.D.; Smith, I.; Fernhoff, P.M., et al. **Neonatal Neurobehavioral Characteristics as Correlates of Maternal Alcohol Use During Gestation.** *Alcoholism: Clinical and Experimental Research* 9(5):454-460, September-October 1985.

Multivariate analysis indicated that neither amount of alcohol used nor cigarette use contributed significantly to neurobehavioral consequences of alcohol consumption during pregnancy. Neurobehavioral consequences of tobacco and marijuana smoking during pregnancy were compared in neonates born to women who (1) drank an average of 12 ounces of absolute alcohol/week throughout pregnancy; (2) drank an average of 14 ounces of absolute alcohol/week, but stopped drinking in the second trimester; and (3) did not drink during pregnancy. Participants were 103 women (predominantly black) of low socioeconomic status who applied for prenatal care at a large inner-city hospital, recruited during the second trimester of pregnancy. Of the 103 mothers, 48 were tobacco smokers (17 nondrinkers, 12 stopped drinkers, and 19 continuing drinkers). Sixteen smoked <10 cigarettes/day, 23 smoked 10 to 20, 6 smoked 20 to 40, and 3 smoked >40 cigarettes/day. Alcohol users were advised to stop drinking. As a group, infants exposed to alcohol at any time during gestation were found to have significant alterations in reflexive behavior, less mature motor behavior, and an increased activity level compared with unexposed infants. Status of infants of mothers who stopped drinking was superior to that of infants whose mothers continued to drink. Regular, heavy marijuana use was uncommon; however, infants of regular users showed low arousal. Results indicate that characteristic damage does occur to the central nervous system of a fetus exposed to alcohol throughout pregnancy and that exposure during only the early part of pregnancy also seems to have measurable effects. (Auth. Abs. Mod.)

86–1115. Crawford, D.C.; Fenton, D.W.; Price, W.I. **Ultrasonic Tissue Characterization of the Placenta: Is It of Clinical Value?** *Journal of Clinical Ultrasound* 13(8):533-537, October 1985.

Placentas of 84 women were examined by ultrasound on 184 occasions throughout pregnancy to determine the relationship between quantitative assessment of ultrasonic placental appearance and clinical factors associated with pregnancy, including smoking, preeclampsia, and low birth weight. The coefficient of variation (standard deviation divided by the mean) of echo-peak amplitude distributions obtained from placental images was used to characterize placentas in different groups. Placentas of smokers yielded higher coefficient of variation values than nonsmokers throughout pregnancy: mean values were 0.528 vs. 0.486 ($p<0.02$), 0.572 vs. 0.537 ($p<0.05$), and 0.635 vs. 0.585 ($p<0.02$), respectively, at <20, 30 to 35, and >35 weeks of gestation. Placental texture index was significantly lower for nonsmoking mothers of low birth weight babies after 30 weeks of gestation ($p<0.001$). Placentas of smokers appear more patchy, demonstrating a larger variation of echo-peak amplitudes than placentas of nonsmokers, which have a more homogeneous texture. This is in agreement with research that demonstrated an increased proportion of calcification, fibrin, and necrotic tissue in placentas of smokers. Quantitative analysis of placental appearance may be of clinical value in selecting nonsmokers at risk for low birth weight infants. (Auth. Abs. Mod.)

86–1116. Halliday, H.L.; Murnaghan, G.A.; Livingstone, B., et al. **The Use of Drugs, Alcohol, and Cigarettes During Pregnancy. (Letter).** *British Medical Journal* 292(6518):486-487, February 1986.

Use of drugs, alcohol, and cigarettes during pregnancy among Belfast women differs significantly from that reported for 2,765 Glasgow women (*British Medical Journal* :81, January 1986). A small pilot trial of drinking, smoking, and drug-taking among 95 women who had recently delivered was based on a questionnaire about the mother's social circumstances. Questions were phrased specifically to doublecheck the answers, and no mothers refused to participate. In comparing results, more women in Belfast were in social class II and more had unemployed partners. There were more nonsmokers (65 percent) in Glasgow than in Belfast (52 percent) and heavy smoking was also more common among Belfast mothers. Alcohol consumption patterns also differed markedly. The differences may have resulted from use of self-administered questionnaires (a practice that may have led to underreporting) and drug use may have been underestimated. Finally, 7 to 8 percent of women approached in the Glasgow study refused to participate.

86–1117. Heeschen, W.H. **Wissenschaftlicher Arbeitskreis Schadstoffe in Frauenmilch. [Scientific Meeting: Harmful Substances in Human Milk.]** *Archives of Gynecology* 238(1-4):199-216, September 1985, German.

A review of the advantages of breast feeding and the harmfulness of certain substances in human milk notes that moderate nicotine, alcohol, or caffeine consumption probably has only a minor influence on the infant. However, because of the potential harmfulness of the substances, consumption should be restricted during lactation. Nitrate, nitrite, and nitrosamine concentrations in human milk are very low. Nitrosamines could not be detected in milk samples from 65 women (detection threshold: 0.4 µg/kg). Polycyclic aromatic hydrocarbons from air dust and smoked meat are found at very low concentrations in human milk. Distribution of these substances into the milk is unlikely. Milk samples from 10 women revealed an average benzo(*e*)pyrene concentration of 0.0163 μg/kg, and an average benzo(*a*)pyrene concentration of 0.0065 μg/kg.

86–1118. Kelly, A.W.; Al-Bassam, S.; Kevany, J. **Teenage Mothers: Pregnancy Performance and New-Born Status.** *Irish Journal of Medical Science* 154(10):390-394, October 1985.

Adolescent mothers have a higher risk associated with particular obstetric and neonatal complications than older mothers, and smoking enhances the risk. Prematurity, stillbirth, and first-week neonatal mortality rates were higher in 874 consecutive adolescent mothers than in a group of older women. Maternal weight gain was less in younger mothers, and a small but significant difference (122 g) in mean birth weight was observed. Primiparous adolescent mothers ≤ 18 years of age were matched with two controls from an adult group aged 20 to 29 years. Matching was based on parity, socioeconomic status, marital status, duration of pregnancy, and smoking habits. Relative risk of a $\leq 3{,}000$ g birth in mothers aged ≤ 18 years, calculated at 2.0, was statistically significant ($p<0.005$). Although based on relatively small numbers, increasing risk with level of smoking was detectable and significant for both groups. (Auth. Abs. Mod.)

86–1119. Klebanoff, M.A.; Koslowe, P.A.; Kaslow, R., et al. **Epidemiology of Vomiting in Early Pregnancy.** *Obstetrics and Gynecology* 66(5):612-616, 1985.

Vomiting during the first trimester of pregnancy was more common among primigravidas ($p=0.002$), younger women ($p<0.001$), women with less than 12 years of education ($p<0.001$), nonsmokers ($p<0.001$), and women weighing 170 pounds or more ($p=0.003$). Factors associated with vomiting in early pregnancy were investigated in 9,098 women in a collaborative perinatal project. Among current nonsmokers, 34 percent of the vomiting group and 33 percent of the nonvomiting group were ex-smokers ($p=0.49$). Among never smokers, 58 percent vomited compared with 46 percent of current smokers. Adjustment for confounding factors did not change the associations. Women reporting vomiting were less likely to experience miscarriage or still birth ($p=0.002$) and delivery before 37 weeks' gestation ($p=0.004$), but no difference was observed in infant birth weight between vomiters and nonvomiters ($p=0.48$). Women who vomit in one pregnancy are more likely to vomit in subsequent pregnancies. (Auth. Abs. Mod.)

86–1120. Loeb, B.K.; Waage, G.; Bailey, J. **Smoking Intervention in Pregnancy.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 389-395.

The problems of smoking intervention in pregnancy, particularly recruiting participants, getting them through a cessation program, and helping them maintain long-term abstinence were studied among 3,856 women (963 smokers) attending a prenatal clinic. The hypothesis that pregnant women are more amenable to smoking intervention was not verified. Of 477 smokers in the intervention program, 56.8 percent answered the endpoint questionnaire compared with 72.8 percent of nonsmokers. Twenty-four percent stopped or reduced smoking by 10 or more cigarettes. Only 12.5 percent of single mothers stopped or decreased smoking versus 27.7 percent of married mothers. Participants active in the program stopped or reduced smoking significantly more frequently than those who dropped out or did not participate: 44.9 percent vs. 9.1 and 18.3 percent, respectively. The number of active participants was significantly higher among women contacted at the clinic (35.9 percent) than among those contacted by letter and phone (25.9 percent) or by letter alone (16.7 percent). Of clinic-contacted women who participated actively in the program, 66 percent stopped or reduced smoking.

86–1121. Olds, D.L.; Henderson, C.R., Jr.; Tatelbaum, R., et al. **Improving the Delivery of Prenatal Care and Outcomes of Pregnancy: A Randomized Trial of Nurse Home Visitation.** *Pediatrics* 77(1):16-28, January 1986.

A comprehensive program of prenatal and postpartum nurse home visitation designed to prevent health and developmental problems in children born to primiparous women who were either teenagers or unmarried or of low economic status was evaluated. During home visits, nurses carried out three basic activities: parent education that included advice designed to improve women's diets, help women monitor their weight gain, and eliminate the use of cigarettes, alcohol, and drugs; enhancement of the women's informal support systems; and linkage of the parents with community services. During pregnancy, smokers who were visited by nurses reduced cigarette consumption level more than smokers in the comparison group (four cigarettes/day difference at end of pregnancy ($p=0.0001$). Nurse-visited smokers also had a 2 percent incidence of preterm delivery compared with 10 percent among smokers in the comparison group ($p=0.04$), and infants in the nurse-visited group were an average of 96 g heavier than those of comparison group smokers (reduced to 39 g after controlling for gestation length). Results suggest that nurse home-visitors are capable of improving women's use of community services, informal social support, and health habits.

86–1122. Scott, K.E.; English, B.; Samson, Y., et al. **Maternal Cigarette Smoking in Nova Scotia.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 473-475.

More than 50 percent of all low birth weight (LBW) infants in Nova Scotia are born to smokers. These infants utilize 50 percent of neonatal intensive care resources and by implication may be the source of 50 percent of LBW mental handicap.

Maternal smoking was the most dominant lifestyle variable affecting birth weight, far outweighing all other factors in a study of enhanced prenatal care (n = 990) and its effect on low weight live births (LWLB) (< 2500 g), source of 85 percent of nonanomaly neonatal deaths. The increasing incidence of smoking among pregnant women is expected to continue as younger cohorts, with high rates of smoking, move through childbearing years. Smoking prevalence was 47 percent in the youngest age group (< 21 years) compared with 24 percent in mothers (31 to 35 years of age) nearing the end of the reproductive years. Seventy percent of smokers consumed ≥ 10 cigarettes/day, the level known to sustain addictive blood levels of nicotine. The LWLB rate was 3 percent in nonsmokers, 4 percent in light smokers (1 to 9 cigarettes/day), and 15 percent in heavy smokers (≥ 10 cigarettes/day). Higher LWLB rates were also observed in mothers who were not motivated to attend prenatal classes, who did not exercise, and who were inadequately nourished. Smokers coped poorly with stress, used alcohol frequently, were less likely to have partner support, and spent less money on food.

86–1123. Sexton, M. **Maternal Cigarette Smoking and the Ghost of Yerushalmy—Will it Ever Rest? (Letter).** *Journal of the American Medical Association* 255(8):1019, February 1986.

Known and possible differences in the women or elements of the trial were addressed in the original article (*Journal of the American Medical Association* 251:911-915, 1984). An additional point that might be considered is possible differences in quit rates between the two trials. Although the number of cigarettes smoked at the end of pregnancy seem to be comparable, quit rates were not reported (*British Journal of Prevention and Social Medicine* 31:6-12, 1977). If the women reduced consumption but did not quit smoking, the children might not have realized a benefit. Further data analysis has raised the possibility that reduction in smoking is not as beneficial as complete abstinence. The concern of observer bias seems unlikely; people making measurements of the newborn were not associated with the study and had no information regarding study group assignment of the women. A trial of antismoking advice before conception would be no clearer regarding interpretation than the one conducted during pregnancy. Although potentially pregnant women could change smoking habits, other changes, such as diet, could also take place before or after they became pregnant. Clarity of causality would not be gained by this approach, since there would be no assurance that everything would remain the same with the exception of smoking reduction. See also 71-0695, 77-0844, 85-0845, 86-1113.

86–1124. Stewart, P.J.; Dunkley, G.C. **Smoking and Health Care Patterns Among Pregnant Women.** *Canadian Medical Association Journal* 133(10):989-994, November 15, 1985.

A 1983 population-based hospital survey of 3,628 women in the postpartum period was conducted to determine prevalence of smoking before and during pregnancy, demographic and socioeconomic characteristics of women who smoke during pregnancy, and use of health care services by these women. Of the women who completed questionnaires (95 percent), 37.4 percent smoked cigarettes before pregnancy. Of the 61.1 percent who changed smoking habits during pregnancy, 31.1 percent stopped smoking, 28.1 percent decreased consumption, and 2.0 percent increased consumption. Two-thirds of the women who quit smoking did so as soon as they realized they were pregnant. More than 50 percent of teenagers, single women, women living in common-law arrangements, and women with less than an 11th grade education smoked after the third trimester. Physicians are in an ideal position to identify pregnant women who smoke and to initiate a health education program. However, only a few smokers attended early prenatal classes. Physicians and class organizers must work to improve this situation if such classes are to have an impact on smoking during pregnancy. (Auth. Abs.)

86–1125. Task Force on Intrauterine Devices for Fertility Regulation. **A Multinational Case-Control Study of Ectopic Pregnancy.** *Clinical Reproduction and Fertility* 3(2):131-143, June 1985.

Cigarette smoking was associated with increased risk of ectopic pregnancy in a World Health Organization multinational study of 1,108 women with ectopic pregnancies who were matched by age, parity, and marital status with an equal number of pregnant and nonpregnant controls. The increased relative risk (RR) of ectopic pregnancy associated with cigarette smoking was 3.1 for pregnant and 1.8 for nonpregnant controls. When cases were compared with pregnant controls, there was an increased risk of ectopic pregnancy associated with use of an intrauterine device (IUD, RR 6.4) and sterilization (RR 10.9) at time of conception, but no increased risk was associated with use of oral contraception or other reversible methods. When cases were compared with nonpregnant controls, the risk of ectopic pregnancy was reduced with all methods, but the protective effect was less marked with the IUD than with the pill and other interval methods or sterilization. A past history of pelvic inflammatory disease or sexually transmitted disease was associated with an increased risk of ectopic pregnancy. The increased risk of ectopic pregnancy associated with cigarette smoking was not consistent in all comparison groups and may have resulted from confounding. Nevertheless, further investigation into this association is required.

86–1126. VandenBerg, M. **Smoking During Pregnancy and Post-Neonatal Death.** *New Zealand Medical Journal* pp. 1075-1078, December 1985.

Smoking during pregnancy was associated with a statistically significant increase in postneonatal death and cot death, but only for infants of smokers aged < 25 years (particularly for infants of Maori smokers aged 20 and 24 years). As a risk factor for postneonatal death, smoking during pregnancy ranked third after Maori maternity (second) and low birth weight (first). Data were from a New Zealand Department of Health 12-month survey of all 316 infants who died before their first birthday. The survey lacked a control group, but is the sole national source of information on the cigarette smoking behavior of mothers of infants who died in the postneonatal period. Results indicate that the relevance of maternal smoking to postneonatal mortality may depend on the total psycho-social-cultural context in which it occurs. It is suggested that factors that initiate and maintain smoking behavior in young women need to be identified and strategies developed to counteract them. (Auth. Abs. Mod.)

86–1127. Van der Velde, W.J.; Copius, J.H.J.; Peereboom-Stegeman, P.E., et al. **Basal Lamina Thickening in the Placentae of Smoking Mothers.** *Placenta* 6(4):329-340, July-August 1985.

Basal lamina of the villous trophoblast and of villous fetal capillaries was found to be significantly thicker in placentas of smokers (>25 cigarettes/day) than of nonsmokers, based on a new method of quantification (electron microscope). In 20 matched pairs of smokers and nonsmokers, placenta thickness averaged 286 nmol in smokers compared with 181 nmol in nonsmokers ($p<0.005$). Thickness of the capillary basal lamina was significantly increased: 75 nmol in nonsmokers and 111 nmol in smokers ($p<0.005$). A larger number of duplications around the capillary basal lamina was also found in placentas of smokers. (Auth. Abs. Mod.)

See also, **86–1001**

86–1128. Werler, M.M.; Pober, B.R.; Holmes, L.B. **Smoking and Pregnancy.** *Teratology* 32(3):473-481, December 1985.

Women seeking prenatal care should be advised that smoking may reduce birth weight and increase the risk of miscarriage and placental disorders. Infants of women who smoke have an average 200 g reduction in birth weight, while birth weights of infants of women who stop smoking during the first half of pregnancy are closer to birth weights of nonsmokers' infants. Nicotine-mediated decrease in placental blood flow may result in hypoxia, causing intrauterine growth retardation. How smoking affects the viability of the fetus and the maternal/placental ability to support the fetus is still unclear. Epidemiologic data indicate that smoking increases the risk for spontaneous abortion and women who are already in high-risk groups for perinatal mortality are at an even greater risk if they smoke. Abruptio placentae and placenta previa have been linked to smoking, and there is evidence that structural changes and decreased functions occur more frequently in the placentas of smokers. Followup studies have found increased risks for both physical and behavioral problems among children whose mothers smoked during pregnancy, but it is unknown if this is the result of postnatal exposure only or if antenatal exposure has an independent effect. Parents should be made aware that studies indicate that infants exposed to smoke at home are at risk for illness and behavior problems in childhood.

OTHER DISEASES AND CONDITIONS

86–1129. Berkowitz, G.S.; Canny, P.F.; Vivolsi, V.A., et al. **Cigarette Smoking and Benign Breast Disease.** *Journal of Epidemiology and Community Health* 39:308-313, 1985.

Cigarette smoking was negatively associated with benign breast disease, according to hospital-based pathology records of 1,232 women aged 20 to 74 years. Current smokers, but not ex-smokers, were at reduced risk for all benign breast diseases. Odds ratios associated with current smoking were 0.7 for fibrocystic breast disease, 0.6 for fibroadenoma, 0.6 for fibrocystic breast disease concomitant with fibroadenoma, and 0.6 for other benign breast diseases. Adjustments for potentially confounding variables, including indices of medical care utilization, affected odds ratios only slightly. There was no convincing evidence of either negative or positive association between current cigarette smoking and degree of epithelial atypia of fibrocystic lesions. However, the negative association between fibrocystic disease and current cigarette smoking was strongest for atypical lobular hyperplasia, which was associated with elevated risk of breast cancer. (Auth. Abs. Mod.)

86–1130. Berstad, A. **Roking og Magesar. [Smoking and Gastro-Duodenal Ulcer.]** *Tidsskrift for Den Norske Laegeforening* 105(29):2049-2051, 2087, 1985, Norwegian.

A literature review found that smoking influences the incidence, healing, and relapse rate of gastric and duodenal ulcers. Among 459 patients with duodenal ulcer, 45 patients with gastric ulcer, and 21 patients with ulcer relapse after proximal vagotomy, 68, 51, and 95 percent, respectively, were smokers. Data from 10 studies (999 patients, 59 percent smokers) that used a variety of treatment methods showed healing rates of 56 percent for smokers compared with 75 percent for nonsmokers. Although the difference between smokers and nonsmokers was not statistically significant in half of the studies reviewed, overall percentages were significantly different. Among 614 patients (60 percent smokers) treated for duodenal ulcer, relapse within 6 months to 1 year occurred in 74 percent of smokers and 49 percent of nonsmokers. The difference between smokers and nonsmokers was significant in three of four studies and for total percentages. The pathogenesis of the smoking effect on ulcers remains unknown. Although small doses of nicotine have been found to stimulate acid secretion, high doses appear to inhibit this activity. Smoking reduces the efficacy of H_2-antagonists, which explains delayed healing in patients treated with these agents, but not the delayed healing in smokers overall. It is pointed out that cessation of smoking can prevent 75 percent of ulcer relapses and increase survival time after surgery in ulcer patients.

86–1131. Feinleib, M. **Epidemiology of Obesity in Relation to Health Hazards.** *Annals of Internal Medicine* 103(6, Part 2):1019-1024, December 1985.

Time trends in national mortality rates have not shown a direct relation to national trends in mean body mass index, and based on Framingham Heart Study data, the prognostic importance of obesity can vary by age, smoking habits, and duration of followup. Examination of total mortality in relation to Metropolitan Relative Weight among 2,223 men followed for 30 years shows that duration of followup influenced the nature of the relationship. During the first 6 years, mortality and weight among nonsmokers had an inverse relationship, but with time the relationship became U-shaped, with minimum mortality at a relative weight of 100 to 109 percent. For young smokers, cumulative mortality was appreciably higher than that for nonsmokers at each interval of followup. Among smokers aged 40 to 49 years, men who were more than 40 percent overweight showed excess mortality throughout the period. The leanest showed excessive death rates after the 18th year. A U-shaped relationship between mortality and relative weight emerged early; however, the minimum point, initially at 130 to 139 percent, did not shift to 100 to 110 percent until 24 years of observation. At 30 years, the U-shape became even more pronounced. (Auth. Abs. Mod.)

86–1132. Fortschritte der Medizin. **Abends Nach Ranitidin Nicht Mehr Rauchen! [No Smoking at Night After Ranitidine!]** *Fortschritte der Medizin* 103(39):66, October 17, 1985, German.

Healing is delayed and relapses occur earlier and more frequently in ulcer patients who smoke. Smokers also suffer more frequently. Surgery is more often necessary and incidence of surgical complications is higher in smokers. Smoking increases acid secretion at night, which antagonizes the effect of H_2-blockers. However, a British—Canadian study has demonstrated that a single evening dose of 300 mg ranitidine is an effective treatment for ulcers in smokers. Healing rates were 96 percent with the single evening dose and 75 percent with divided doses. It is concluded that, since prohibition of smoking in ulcer patients is usually unsuccessful, patients should at least be dissuaded from smoking after taking a nightly dose of rantidine.

86–1133. Huuskonen, M.S.; Jarvisalo, J.; Koskinen, H., et al. **Serum Angiotensin-Converting Enzyme and Lysosomal Enzymes in Tobacco Workers.** *Chest* 89(2):224-228, February 1986.

Chronic extrinsic allergic alveolitis, suspected to be associated with exposure to molds, was studied in 57 tobacco workers through sera analyses of angiotensin-converting enzyme (ACE) and two lysosomal enzymes, β-N-acetylglycosaminidase (NAG) and β-glucuronidase (GLU). Serum ACE levels in nonexposed tobacco workers were similar to those of 127 workers not occupationally exposed to dust (controls). Serum NAG (16.0±2.0 units/L) and GLU (2.4±0.7 units/L) in tobacco workers were higher than among controls (NAG 9.1±2.0 units/L, GLU 1.0±0.6 units/L; $p<0.01$). Fifteen tobacco workers with respiratory symptoms compatible with pulmonary disease caused by organic dust had a trend toward increased ACE, NAG, and GLU levels. Mean level of ACE in serum was higher among workers with pulmonary fibrosis (25.8±4.5 units/L) than among those without (20.7±7.5 units/L; $p<0.025$). Mean ACE level was also higher among workers with highest exposure to molds (24.6±7.1 units/L) than in those with mild exposure (18.3±5.7 units/L; $p<0.05$). Tobacco workers with or without antibodies against one or more microbes had similar mean levels of ACE, NAG, and GLU. Findings indicate that raw tobacco dust and its contaminants may cause allergic and toxic reactions, reflected by serum levels of ACE, NAG, and GLU. (Auth. Abs. Mod.)

86–1134. Klaver, J.H.J.; Greve, E.L.; Goslinga, H., et al. **Blood and Plasma Viscosity Measurements in Patients With Glaucoma.** *British Journal of Ophthalmology* 69(10):765-770, October 1985.

Blood viscosity at 10 shear rates, plasma viscosity, packed cell volume, plasma fibrinogen, serum α_2-macroglobulin, and serum proteins were measured in 83 patients with low-tension glaucoma (LTG) and 23 patients with high-tension glaucoma (HTG, at least one intraocular pressure reading above 40 mm Hg) and 50 controls. Blood and plasma viscosity values and packed cell volume were significantly higher in the LTG group than in controls. HTG and LTG groups differed only in plasma viscosity; however, smoking and drinking habits in HTG patients (74 percent smokers) were greatly different from LTG patients (18 percent smokers) and controls (14 percent smokers), preventing interpretation of data in the HTG group. In the LTG group, viscosity values were highest in a subgroup designated earlier as having focal ischemic LTG; another subgroup, with senile sclerotic LTG, did not show significant differences compared with controls. Findings may indicate a factor in pathogenesis of visual field defects and disc cupping in some patients with LTG. (Auth. Abs. Mod.)

86–1135. Lam, S.-K.; Lai, C.-L.; Ng, M., et al. **Duodenal Ulcer Healing by Separate Reduction of Postprandial and Nocturnal Acid Secretions Have Different Pathophysiology.** *Gut* 26(10):1038-1044, October 1985.

Habitual cigarette smoking adversely affected ulcer healing with cimetidine taken at mealtime but not with other treatment regimens, indicating that the adverse effect disappeared once nocturnal acid secretion was reduced. Endoscopic healing rates of two cimetidine treatment regimens designed to reduce postprandial and nocturnal acid secretions, respectively, were studied in a randomized trial of cimetidine 200 mg taken three times/day (tds) with meals vs. 600 mg at bedtime vs. 200 mg tds with meals plus 400 mg at bedtime in 246 patients with duodenal ulcer. Respective healing rates were 62.3 percent, 63.1 percent, and 77.5 percent at 4 weeks, and 86.6 percent, 83.3 percent, and 91.2 percent at 8 weeks. Healing rates at 4 weeks of both mealtime and bedtime regimens were inferior ($p<0.05$) to that of standard regimen. In addition to smoking, 45 prospectively obtained factors were analyzed. Failure to abstain from smoking during treatment was also more significantly associated with nonhealing. Possible explanations are that (1) smoking facilitates nocturnal acid secretion, and (2) smoking impairs the healing process taking place during sleep and that reduction of nocturnal acid secretion is permissive to the healing process. The majority of smokers had smoked continuously for >10 years, and all had smoked for at least 5 years. The effect of analgesics on ulcer healing is also discussed. (Auth. Abs. Mod.)

86–1136. McSharry, C.; Banham, S.W.; Boyd, G. **Effect of Cigarette Smoking on the Antibody Response to Inhaled Antigens and the Prevalence of Extrinsic Allergic Alveolitis Among Pigeon Breeders.** *Clinical Allergy* 15(5):487-494, September 1985.

Serum levels of immunoglobulin (Ig) G, A, M, D, and E antibodies were determined in 102 pigeon breeders (23 smokers, 14 ex-smokers, and 65 nonsmokers) and compared with incidence of extrinsic allergic alveolitis (EAA). Overall, prevalence of EAA symptoms was lower among cigarette smokers (21.7 percent) than among ex-smokers (42.9 percent) and nonsmokers (33.8 percent). Smokers had a significantly lower antibody response against the inhaled antigens associated with EAA; only 1 smoker had elevated serum IgG antibody levels compared with 39 nonsmokers, despite similar degrees of avian exposure. The appearance of antibodies in six ex-smokers (42.9 percent) suggested that the apparent inhibitory effect of smoking on the antibody response was reversible. Smokers had lower total serum IgG (10.8 mg/mL) and IgA (2.2 mg/mL), higher serum IgD (2.4 mg/mL), and similar total IgM (1.1 mg/mL) and IgE (142 international units/mL) levels compared with levels in nonsmokers (13.5, 2.7, 1.7, 1.1, and 140, respectively). A significantly higher proportion of smokers (82.6 percent) experienced symptoms of chronic bronchitis than ex-smokers (57.1 percent) or nonsmokers (13.8 percent).

86–1137. Molvaer, O.I.; Lehmann, E.H. **Hearing Acuity in Professional Divers.** *Undersea Biomedical Research* 12(3):333-349, September 1985.

Smoking appeared to be an additional hazard for high-frequency hearing in divers. Hearing impairment among divers is closely correlated with increasing age, increasing diving experience, and acoustic trauma. A statistically significant elevation ($p=0.01$) of the high-frequency hearing threshold was demonstrated in smokers compared with never smokers, based on pure tone audiograms and relevant history of 164 professional divers aged from 19 to 66 years (mean 30.9 years). The divers' hearing threshold was elevated in high frequencies in all age groups compared with ISO normality curves. It was, however, lower than that of a Norwegian standard population at a young age (probably the result of selection procedures for the diving profession). In the fourth decade of life, divers' high frequency hearing was at the same level as that of the standard population, suggesting a faster deterioration in divers. It is concluded that smoking may contribute to the observed hearing impairment. (Auth. Abs. Mod.)

86–1138. Ogawa, H.; Tominaga, S.; Aoki, K. **Smoking and Various Physical Complaints.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983*, Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 171-176.

Prevalence of various physical complaints increased significantly with number of cigarettes smoked/day among 2,828 Japanese civil service employees (25 percent nonsmokers, 25 percent smokers, and 50 percent ex-smokers), based on results of a health screening questionnaire. Complaints included sputum, cough, frequent use of stomach medicine, stomach pain, diarrhea, shortness of breath, palpitation, dyspnea, stiff shoulders, neck tension, lumbago, back pain, hoarseness, numbness of limbs, swollen eyelids, lethargy, chewing difficulty owing to poor teeth, history of jaundice, frequent use of health medicine, and decreased appetite. Urination at night was the only complaint that decreased significantly with increased consumption. Sputum, cough, numbness, chewing difficulty, and sick leave decreased significantly with the number of years since smoking cessation. White tongue, swollen eyelids, and decreased appetite were less frequent in ex-smokers than in current smokers, while nosebleeds, blurred vision in the center of the visual field, constipation, and history of parasitic disease increased linearly with number of years after stopping smoking. Ex-smokers had more complaints than current smokers regarding duodenal ulcer, strangling sensation in the chest, urination at night, chronic illness, and nasal disturbances.

86–1139. Ostensen, H.; Gudmundsen, T.E.; Ostensen, M., et al. **Smoking, Alcohol, Coffee, and Familial Factors: Any Associations With Peptic Ulcer Disease? A Clinically and Radiologically Prospective Study.** *Scandinavian Journal of Gastroenterology* 20(10):1227-1235, 1985.

Familial factors and smoking may be factors in etiology of peptic ulcer, according to a Norwegian study of gastric and duodenal ulcer patients. Significantly more smokers were noted among patients with gastric or duodenal ulcers than among controls, particularly in those aged 15 and 29 and 60 and 90. More heavy smokers (≥ 10 cigarettes/day) were found among gastric ulcer patients in the 15- to 29-year-old group. Risk of duodenal ulcer was increased 100 percent in female smokers compared with female nonsmokers; risk of gastric ulcer was increased approximately 25 percent (relative risk (RR) 2.7). In men, RR of gastric and duodenal ulcers was 1.5 and 1.4, respectively. In women, no correlation was found between quantity smoked and increase in RR; however, in men a statistically significant positive correlation was demonstrated between amount of tobacco used and RR of duodenal ulcer ($r=0.9729$; $0.01<p<0.05$). No such correlations for gastric ulcer could be shown. (Auth. Abs. Mod.)

86–1140. Paoluzi, P.; Ricotta, G.; Ripoli, F., et al. **Incompletely and Completely Healed Duodenal Ulcers' Outcome in Maintenance Treatment: A Double Blind Controlled Study.** *Gut* 26(10):1080-1085, October 1985.

In asymptomatic duodenal ulcer patients, stratified according to type of healing and randomly allocated to cimetidine (200 mg at lunch or 400 mg at bedtime) or placebo and examined endoscopically 6 months later (or when symptoms occurred), 56 were completely healed and 31 were incompletely healed. Smokers receiving cimetidine had a nonsignificantly higher ulcer recurrent rate than nonsmokers (55 vs. 38 percent); however, smokers in the placebo group showed a significantly higher ulcer recurrent rate (47 vs. 22 percent, $p<0.05$). When no effective drug was administered, smoking was a negative prognostic factor in ulcer recurrence, but cimetidine treatment seemed to reduce the importance of this factor. A significantly higher ulcer crater recurrence was observed in incompletely healed ulcer patients, even when cimetidine or placebo treatment groups were considered separately. Ulcer crater recurrence was more frequent in placebo-treated patients than in those treated with cimetidine (67 vs. 29 percent, $p<0.001$). It is concluded that maintenance treatment should start only after assessment of complete endoscopic healing to prevent a high ulcer recurrence rate. (Auth. Abs. Mod.)

86–1141. Petring, O.U.; Adelhoj, B.; Ibsen, M., et al. **Abstaining From Cigarette Smoking Has No Major Effect on Gastric Emptying in Habitual Smokers.** *British Journal of Anaesthesia* 57(11):1104-1106, November 1985.

Abstention from smoking had no major effect on gastric emptying in seven healthy habitual smokers (15 to 25 cigarettes/day) between 25 and 35 years of age, who were studied on two occasions separated by at least 2 weeks. Rate of liquid phase gastric emptying was determined from paracetamol absorption rate after overnight abstention and again after smoking two cigarettes within 30 minutes. Following abstention, the time to reach peak paracetamol concentrations was 27±3.6 minutes. Peak serum paracetamol concentration was 20.1±1.8 μg/mL and the area under the plasma concentration-time curve from 0 to 120 minutes was 1,465±74.5 μg/minute. After smoking, peak paracetamol concentration was reached at 39.9±9.0 minutes; peak paracetamol concentration was 18.1±6.5 μg/mL. Area under the plasma concentration-time curve was 1,089±186/μg minute. None of the values was significantly different ($p>0.05$). Data indicate that, at most, cigarette smoking could delay or accelerate liquid phase gastric emptying by about 1 hour. However, the individual differences seen may reflect variations in gastric emptying produced by abstention from smoking. (Auth. Abs. Mod.)

86–1142. Van Wyk, C.W. **An Investigation Into the Association Between Leukoedema and Smoking.** *Journal of Oral Pathology* 14:491-499, 1985.

Incidence of leukoedema, a diffuse opalescent lesion of the cheek mucosa, studied in 1,341 male and 655 female high school pupils (14 to 18 years of age) to determine the relationship to smoking, produced contradictory results. Only in some subgroups was it found that (1) there were significantly more smokers than nonsmokers among students with leukoedema; (2) students with leukoedema consumed significantly more tobacco than those without leukoedema; and (3) leukoedema incidence increased with age. Analysis, which showed a relationship between sex and leukoedema, also found that leukoedema was independent of smoking. Prevalence of the condition did not vary between smokers and ex-smokers and no correlation existed between the type of smoking and between the severity of the lesion and the amount of tobacco consumed. It was concluded that smoking does not cause the lesion, but may be responsible for aggravating the condition. The etiology of leukoedema was considered multifactorial. (Auth. Abs. Mod.)

86–1143. Volkert, H. **Rauchen und Ulkus. Stellenwert des Rauchens beim Ulkuspatienten. [Smoking and the Ulcer. The Effects of Smoking in Ulcer Patients.]** *Zeitschrift fur Allgemeinmedizin* 61(29):15-16, October 1985, German.

Smoking is more likely to cause bronchial carcinoma or bronchitis than ventricular or duodenal ulcer, attendees of the "Smoking and Ulcers" symposium were told. Discussions were limited to association, causality, and pathogenesis of ulcers. Although a distinct association could not be denied, it remained unclear whether smoking causes ulcers or whether personality traits encourage ulcer development. Pathogenesis of ulcers is still being debated. Smoking decreases the effectiveness of medicines used to treat ulcers, such as ranitidine and cimetidine. Among patients using H_2 blockers, relapse rates are 49 percent for smokers compared with 27 percent for nonsmokers. Smokers with ulcers should quit, but none of the various smoking cessation therapies have long-term success rates. It is suggested that a "strong word" from the physician might suffice without recourse to further measures. Nicotine chewing gum was recommended for the first few months of smoking cessation therapy.

86–1144. Whitfield, P.F.; Hobsley, M. **Maximal Gastric Secretion in Smokers and Nonsmokers With Duodenal Ulcer.** *British Journal of Surgery* 72(12):955-957, December 1985.

Maximal gastric secretion in preoperative patients with duodenal ulcer, evaluated by sex, stature, age, and smoking habits, was greater in men than in women and in smokers than in nonsmokers. Chronic smoking, at least in men, appears to increase maximal gastric secretion, and could play a role in etiology of duodenal ulcer. A prospective study conducted over a 16-year period measured maximal gastric secretion in 201 patients (146 men, 171 smokers) with duodenal ulcer. Maximal gastric secretion was induced by intravenous infusion of histamine (130 nmol kg^{-1} h^{-1}). Multiple regression analysis showed that height and total number of cigarettes smoked were significant positive factors, and age was a significant negative factor in magnitude of maximal gastric secretion. However, when factors were standardized, differences between the sexes and the smoking groups disappeared. (Auth. Abs. Mod.)

See also, **86–1020**

BEHAVIORAL AND PSYCHOLOGICAL ASPECTS

86–1145. Abelin, T. **Smoking Among Children.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 243-253.

Smoking initiation in children is examined using an epidemiological model of host, agent, and environment as applied in disease causation. In the epidemiology of infectious diseases, host factors refer to disease susceptibility, agents are specific microorganisms or parasites, and environmental factors might refer to sanitary conditions. Availability of cigarettes (agent factor) may include (1) accessibility to vending machines, (2) sales of single cigarettes, and (3) distribution of free samples. Product attractiveness can be reduced by (1) cost, (2) health hazard warnings, and (3) declaration of harmful substances. Environmental factors may include (1) examples set by parents, siblings, and peers; (2) images of smokers in advertisements, movies, and television; and (3) preserving a nonsmoking atmosphere at home, school, and other places frequented by children. The host factor facilitates smoking prevention through involvement, self-image, knowledge, and skills. Training children to decode advertising messages, analyze advertising techniques, make decisions, cope with anxiety, and develop social and communicative skills and assertiveness are discussed.

86–1146. Ary, D.V.; Biglan, A.; Gallison, C.L., et al. **Longitudinal Prediction of the Onset and Change of Adolescent Smoking.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 641-648.

Adolescents who smoke are more likely to quit or decrease consumption if (1) consumption rate is not high; (2) few of their friends smoke; and (3) parents disapprove of smoking. Data on smoking predictors (including alcohol and marijuana use), based on questionnaire responses from 884 seventh, ninth, and tenth grade students, associated onset of smoking with grade level, but found no sex-related differences. Marijuana use is a better predictor for middle school students and number of friends who smoke is a better predictor for high school students. It is suggested that marijuana use and cigarette smoking in middle school are "deviant" behaviors and apply to a small number of students. A high negative correlation between cigarette offers and followup smoking rate for seventh grade nonsmokers was found, implying that if a student has been receiving and successfully refusing offers to smoke, he or she is more likely to remain a nonsmoker. This finding supports prevention curricula that stress refusal skills.

86–1147. Buechner, J.S.; Perry, D.K.; Scott, D., et al. **Cigarette Smoking Behavior Among Rhode Island Physicians, 1963-83.** *American Journal of Public Health* 76(3):285-286, March 1986.

Cigarette smoking among practicing physicians in Rhode Island declined from 12.7 percent in 1978 to 8.3 percent in 1983. For all tobacco products the rate was 12.5 percent in 1983, with only men reporting smoking products other than cigarettes. The proportion of smokers was 33.0 percent in 1963, 22.6 percent in 1968, and 19.0 percent in 1973 (an annual decline of approximately 6.7 percent of current smokers). Cigarette smoking rates among medical specialties in 1983 ranged from 14.4 percent for obstetrics/gynecology to 3.8 percent for otolaryngology. All specialties, with the exception of orthopedic surgeons, showed decreases from 1978 rates. Rates increased with age from 6.3 percent of physicians aged 25 to 34 years to 12.3 percent of those aged 75 years and older. Overall, 60 percent of physicians in all age groups reported never having smoked cigarettes. In all but two age groups (25 to 34 and 65 to 74 years) the percentage of smokers was greater for males than for females; overall smoking rates were 8.5 and 6.6 percent, respectively. An exponential model projects an overall smoking rate for Rhode Island physicians of less than 3 percent by the year 2000.

86–1148. Burling, T.A.; Stitzer, M.L.; Bigelow, G.E., et al. **Smoking Topography and Carbon Monoxide Levels in Smokers.** *Addictive Behaviors* 10:319-323, 1985.

Carbon monoxide (CO) boost may prove to be a simple and accurate method for measuring smoke exposure/cigarette in individuals. Factors that affect expired air CO levels of smokers were examined in matched pairs who smoked an equal number of cigarettes, but had different CO levels. Measures of puff number, duration, and spacing, and amount of CO increase/cigarette (CO boost), were assessed while subjects smoked a single cigarette in daily laboratory sessions. Persons with relatively high CO levels had larger increases in CO after smoking a single cigarette than individuals with low CO levels ($p < .005$), but did not differ on any other smoking topography measure. Data suggest that simple topography measures of puff number and duration may not contribute to differences in tobacco smoke exposure, and that greater attention should be given to more refined measures such as puff volume and depth of inhalation. The 7 males and 17 females smoked an average of 20.4 cigarettes/day and had an average afternoon CO level of 27.5 ppm. Difference in average CO level between individual pairs ranged from 7.2 ppm to 35.0 ppm (average, 15.4 ppm). (Auth. Abs. Mod.)

86–1149. Carmody, T.P.; Brischetto, C.S.; Matarazzo, J.D., et al. **Co-Occurrent Use of Cigarettes, Alcohol, and Coffee in Healthy, Community-Living Men and Women.** *Health Psychology* 4(4):323-335, 1985.

Co-occurrent use of cigarettes, alcohol, and coffee was examined in cross-validated subsamples of 226 males and 245 female participants in the Family Heart Study, a 5-year dietary intervention program. Results of a log-linear analysis indicate that for both sexes, smokers and ex-smokers were more likely than nonsmokers to drink greater amounts of alcohol and coffee. Furthermore, for smokers, ex-smokers, and nonsmokers, a majority of individuals who reported drinking more alcohol also reported drinking more coffee. The coffee and alcohol consumption levels of ex-smokers were found to resemble those of smokers more than those of nonsmokers. Ex-smokers also reported drinking more wine and decaffeinated coffee than either smokers or nonsmokers. The number of cigarettes smoked/day was positively related to total alcohol and coffee consumption in men but not in women. Further studies are recommended to examine the role of individual differences in the development, maintenance, and modification of these three appetitive habits and their co-occurrence. (Auth. Abs. Mod.)

86–1150. Chait, L.D.; Russ, N.W.; Griffiths, R.R. **Effects of Graded Smoke Inhalation on Subsequent Cigarette Smoking Behavior.** *Addictive Behaviors* 10:273-280, 1985.

Increase in cigarette interpuff interval is the result of satiation, according to a study standardizing puff topography and duration of inhalation to minimize puff-to-puff variability in smoke delivery. Two men and three women smoked a cigarette ad libitum 1 minute after inhaling either 0, 2, 4, 8, or 12 puffs of tobacco smoke acording to a standardized smoking regimen. Heart rate and expired air carbon monoxide levels increased linearly with increasing number of pretreatment puffs. Fewer puffs were taken and less time was spent smoking and puffing on a cigarette as the number of pretreatment puffs increased. Duration of individual puffs, which decreased as the cigarette was smoked, was not affected by puff pretreatment. Intervals between successive puffs generally increased during smoking of the first half and leveled off or decreased for the second half of the cigarette. Interpuff intervals occurring early tended to increase after 12-puff pretreatment. (Auth. Abs. Mod.)

86–1151. Cooreman, J.; Neukirch, F.; Perdrizet, S. **Le Tabagisme et les Adolescentes Scolarisees. [Tobacco and Female Adolescent Students.]** *Medecine et Hygiene* 43(1631):3381-3384, November 1985, French.

A 5-year survey of 58,486 French adolescents (aged 14 to 19 years, 50 percent girls) found that smoking has been steadily increasing, but at a faster rate among girls. Females smoked more cigarettes/day than males during 1976, 1979, and 1981 (9.3 vs. 7.1, 9.6 vs. 7.7, and 9.5 vs. 8.0, respectively). Consumption level correlated with incidence of respiratory complaints and indicated that females were more vulnerable than males to chronic cough, particularly heavier smokers (≥ 10 cigarettes/day). Starting age for smoking was usually at about 15 years of age. Adolescents were generally aware of the dangers of smoking, but that awareness did not deter them from smoking. It is concluded that health education strategies should concentrate on convincing arguments against smoking and should be especially addressed to female adolescents.

86–1152. Elkind, A.K. **The Social Definition of Women's Smoking Behaviour.** *Social Science Medicine* 20(12):1269-1278, 1985.

Opinions of young women in training for nursing and teaching showed that traditional concepts of appropriate female behavior continue to inhibit smoking among some women, while others perceive smoking as an aspect of independent behavior. Smoking was considered unacceptable to women whose parents had expressed attitudes toward their daughter's smoking in relation to sex-role norms. More than half of the 107 students surveyed perceived a negative cultural stereotype (i.e., smoking is a male behavior and inappropriate for women) to be operating in contemporary society and two-thirds recognized its existence in the past. The stereotype operated more strongly in the general social background than in reference to personal relationships; therefore, its influence on contemporary behavior was limited. Others perceived the female smoker as an elegant/sophisticated extrovert for whom smoking was symbolic of independence. Still others attributed no sex role to smoking, but normal social behavior for men and women alike. In another group of 66 nurses and 28 teachers surveyed 8 to 10 months after beginning training, smokers and nonsmokers had divergent views of the image of the female smoker. Nonsmokers saw the image as "unladylike," whereas smokers identified it with the "liberated" woman. The role of health education and advertising are also discussed. (Auth. Abs. Mod.)

86–1153. Garfinkel, L.; Stellman, S.D. **Cigarette Smoking Among Physicians, Dentists, and Nurses.** *CA—A Cancer Journal for Clinicians* 36(1):2-8, January-February 1986.

Data on 11,324 physicians, 2,892 dentists, and 44,568 nurses (40 years of age or older) throughout the United States indicate that 16.7 percent of doctors, 14.1 percent of dentists, and 23.4 percent of nurses smoke. Among doctors and dentists, there are twice as many ex-smokers as current smokers. Among nurses, 25.5 percent have quit smoking and more than 50 percent have never smoked. There are more smokers among physicians aged 50 to 59 than among younger doctors, and the smoking rate diminishes in older doctors. Smoking rates among dentists are similar, although the peak smoking years are between 40 and 49. Male nurses have unusually high smoking rates (41.3 percent). Nearly 41 percent of male doctors smoke ≥ 21 cigarettes/day compared with 30.8 percent of female doctors, 36.7 percent of male nurses, and 23.8 of female nurses. In a comparison of tar levels in cigarettes smoked, 12 percent of male doctors consumed <5 mg and 27.9 percent consumed ≥ 20 mg (mostly nonfiltered cigarettes). Female physicians smoked cigarettes with lowest yields. Fewer female nurses than female doctors smoked cigarettes with <5 mg tar (14.3 vs. 20.3 percent). Only 6.7 percent of male nurses smoked cigarettes with <5 mg tar. (Auth. Abs. Mod.)

86–1154. Gori, G.B.; Lynch, C.J. **Analytical Cigarette Yields as Predictors of Smoke Bioavailability.** *Regulatory Toxicology and Pharmacology* 5(3):314-326, September 1985.

Smoking behavior is regulated by pharmacodynamic satiation, and smokers of very-high-yield brands compensate downward, while smokers of low-yield brands compensate upward. Smoke intake of 865 undisturbed smokers of >10 cigarettes/day was determined by measuring plasma nicotine and cotinine and expired carbon monoxide (CO). While nicotine yields, according to Federal Trade Commission (FTC) analytical standards, varied sixteenfold (0.1 to 1.6 mg/cigarette), corresponding plasma nicotine levels were from 0.75 to 1.25 mg/cigarette. CO in expired air and plasma cotinine values varied in similar proportion, but mean cigarette consumption was independent of the FTC nicotine yield of cigarettes smoked. The ratio of tar yield to nicotine usually increases with increasing tar yield; therefore, tar intake is likely to increase at higher tar yields, even though the increment of nicotine intake is small. It is suggested that FTC analytical determinations are poor predictors of relative intake of nicotine, CO, or tar, and that rankings based on the mean ratio of a brand would be more meaningful. Considerable variation of individual smoking behavior suggests that precise numerical rankings of cigarettes are not justified and an analogic ranking of cigarettes into a few broad classes would better reflect the realities and expectations of average consumers. (Auth. Abs. Mod.)

86–1155. Gray, E.M.; Gammage, P.; Morgan, M.J., et al. **Smoking Education for Teenagers.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 293-298.

Application of peer-led smoking education to teenagers in the United Kingdom is described. The British adaptation of the Minnesota peer-led social consequences curriculum for 12- to 13-year-olds, "Smoking and Me," is now undergoing formative evaluation in selected English and Welsh schools. Examination and evaluation of Smoking Education for Teenagers (SET) for applicability to England began with semistructured interviews with 80 14-year-olds, using the criterion that the subject had tried at least one cigarette. First experiences and current smoking status were explored for identifying possible psychosocial predictors of nonsmokers, experimenters, and potential addicted smokers. The resulting nonanonymous questionnaire was designed for confidentiality (parents and teachers would not know responses), but required names because (1) the putative link between smoking and friendship patterns explored in some questions required children to name close friends; and (2) names would be necessary for initial identification in followup. To learn more about the nature of dependence, a saliva sample was also required of some children for comparison with reported type of smoking and perceived levels of addiction.

86–1156. Grymaloski, J.W. **Need for Approval and Household Smoking as Two Indicators of Susceptibility to Peer Smoking Influence.** *Canadian Journal of Public Health* 76(4):244-249, July-August 1985.

Adolescents having a high need for approval were less susceptible to peer smoking influence, while lack of approval motive was associated with increased susceptibility to peer smoking pressure. Peer smoking was found to have a strong linear relationship with smoking frequency: smoking frequency was 3.5 percent among those who had no friends who smoked compared with 71 percent in the group where the "best friend" plus three or four other friends smoked. By comparison, household smoking seemed to be an indicator of susceptibility to peer smoking influence, and contributed very little to smoking frequency when the peer smoking factor was taken into account. Adolescents from nonsmoking households were inordinately susceptible to peer smoking influence. Findings suggest that smokers with personalities characterized by little need for approval are responsible for enhancing smoking frequency by (1) proving to be undeterred by usual prevention schemes, and (2) serving as a source of exposure for peers. Such student smokers can make prevention schemes less effective by serving as a core of resistance to treatment, i.e., capable of reinforcing their own habit while waiting to infect susceptible peers. (Auth. Abs. Mod.)

86–1157. Hansen, W.B.; Collins, L.M.; Johnson, C.A., et al. **Self-Initiated Smoking Cessation Among High School Students.** *Addictive Behaviors* 10:265-271, 1985.

Psychosocial predictors of self-initiated smoking cessation were examined among students from nine high schools. Students were pretested using a questionnaire that assessed smoking behavior, beliefs about positive and negative consequences of smoking, rebelliousness, peer smoking, and parental smoking. Smokers identified at pretest were reexamined 3 and 15 months later. Moral attitudes, peer smoking, and positive beliefs about smoking significantly discriminated continuing smokers from quitters at the 3-month posttest. Negative beliefs about smoking, parental smoking, and rebelliousness significantly discriminated between those who quit and later relapsed and those who quit and maintained nonsmoking status at 15-month posttest. Smoking characteristics at pretest failed to discriminate either those who would quit or those who would maintain nonsmoking status. Results support development of public information programs that encourage early cessation of smoking, feature the development of appropriate attitudes and beliefs, and foster social support. (Auth. Abs. Mod.)

86–1158. Ishihara, K.; Miyasita, A.; Inugami, M., et al. **Differences in the Time or Frequency of Meals, Alcohol and Caffeine Ingestion, and Smoking Found Between "Morning" and "Evening" Types.** *Psychological Reports* 57(2):391-396, October 1985.

Smoking behavior differed significantly between morning types (Larks) and evening types (Owls) in an investigation of lifestyles among 1,500 university students. Life habit parameters (i.e., time of or frequency of meals, night meal, ingestion of alcohol and caffeine, and smoking habit) analyzed in 110 morning and 339 evening types (definite and moderate) revealed that evening types smoked more ($p<.001$), ingested more caffeine ($p<.05$) and alcohol ($p<.01$), and ate a night meal ($p<.001$) more often than morning types. Smoking differences were partially explained by personality traits, particularly extroversion vs. intraversion. Of morning types, 102 were nonsmokers, 5 smoked <10 cigarettes/day, 1 smoked 10 to 20, 1 smoked 20 to 30, and 1 smoked >30 cigarettes/day. Of evening types, 173 were nonsmokers, 53 smoked <10 cigarettes/day, 67 smoked 10 to 20, 39 smoked 20 to 30, and 7 smoked >30 cigarettes/day. It is suggested that the more regular sleep-waking habits of the morning types may reflect tendencies of introverts to have healthy habits, including less smoking and less alcohol ingestion.

86–1159. Istvan, J.; Matarazzo, J.D. **Tobacco, Alcohol, and Caffeine Use: A Review of Their Interrelationships.** *Psychological Bulletin* 95(2):301-326, March 1984.

The interrelationships of tobacco, alcohol, and caffeine consumption are examined in a research review. Evidence indicates that among each of the three possible pairs of relationships, alcohol and tobacco use and tobacco and caffeine use are moderately to strongly related and caffeine and alcohol use are weakly related. No studies were found that examined the concurrent use of all three substances. The need for improved methods of assessing substance use and research examining health-risk behaviors as interrelated clusters is emphasized, and mechanisms that might account for these interrelationships are discussed. (Auth. Abs. Mod.)

86–1160. Johnson, F.Y.A. **Attitudes of Nigerian Medical Students Towards Use and Abuse of Tobacco, Alcohol and Drugs.** *Drug and Alcohol Dependence* 15(4):323-334, August 1985.

Results of a World Health Organization questionnaire standardized for use across cultures and modified to suit an African culture found that 78 percent of medical students in Nigeria disapprove of tobacco, alcohol, and drug use, 11 percent disapproved slightly, and 11 percent did not disapprove. Data also showed that (1) 77 percent disapproved of smoking one or more packs of cigarettes/day; (2) 91 and 93 percent, respectively, disapproved of smoking cannabis occasionally or regularly; (3) 80 and 95 percent, respectively, disapproved of taking LSD once or twice or regularly; and (4) 94 percent disapproved of taking heroin either occasionally or regularly. Availability of drugs was perceived as "very easy" by 29.3 percent and "fairly easy" by 26.7 percent. Drug use was perceived as a great risk by 43.6 percent, moderate risk by 26.5 percent, and slight risk by 16.9 percent. Use of alcohol was problem related for 81 students out of the 104 sampled. The sample population was predominantly Christian (84.6 percent).

86–1161. Jones, M.C. **The Prevalence of Smoking Among Nurses of the Forth Valley Health Board Area.** *Health Bulletin* 43(5):240-244, September 1985.

Smoking among hospital nurse students in a Scottish health board area was significantly reduced after medical/surgical training, despite high smoking prevalence among the trained staff. Smoking decreased from 26.6 percent before training to 10 percent after training among the 60 students compared with 40.6 percent among the training staff. High incidence of smoking among trained nurses was attributed to a low awareness of the health hazards of smoking despite contact with patients suffering from tobacco-related diseases. Results indicate that the trained staff may not have the knowledge base needed for antismoking health education, and as provider and exemplar, may not be fulfilling this professional role nor providing antismoking health education to patients.

86–1162. Kristiansen, C.M. **Smoking, Health Behavior, and Values: A Replication, Refinement, and Extension.** *Addictive Behaviors* 10:325-328, 1985.

Health behavior and values and their relationship to smoking status were investigated in 181 female undergraduate students using the Rokeach instrumental value survey and a terminal value survey that included the value "health" and measures of general preventive health behavior and social desirability. Nonsmokers reported better health behavior than smokers, particularly for direct rather than indirect risk behavior. While there was no difference in the value of "health," smokers gave more priority to being "broadminded" than nonsmokers and were also more concerned with "freedom," being "independent," and not being "obedient," suggesting that smokers were more concerned with being "flexible" or "unconstrained." Being "broadminded" was inversely related to general health behavior and direct risk behavior of smokers. Findings suggest that decreasing the extent to which smokers value "broadmindedness" might reduce smoking and also affect general preventive health behavior. (Auth. Abs. Mod.)

86–1163. Lerchen, M.L.; Samet, J.M. **An Assessment of the Validity of Questionnaire Responses Provided by a Surviving Spouse.** *American Journal of Epidemiology* 123(3):481-489, March 1986.

Information on lifetime occupational history, smoking habits, and consumption of certain foods high in vitamin A, obtained from 80 wives in 1983 and 1984, was compared with data provided in 1980 through 1982 by the husbands, who were patients in a case—control study of lung cancer. There was perfect agreement regarding cigarette smoking status (ever vs. never) in responses. Mean values reported by patients and wives were not significantly different for age at which the husband started to smoke (16.4 vs. 15.9 years), total years of smoking (46.1 vs. 46.8), and average number of cigarettes smoked/day (27.6 vs. 27.9). For daily cigarette consumption, wives tended to report 20 cigarettes smoked even when husbands smoked substantially more or less. With regard to lifetime occupational histories, wives reported significantly fewer jobs. Concordance of coded histories was approximately 50 percent for occupation and industry, but was higher for the last job and usual job held. Reports of mean frequencies of consumption of certain foods were comparable. (Auth. Abs. Mod.)

86–1164. Miller, P.; Wikoff, R.L.; McMahon, M., et al. **Indicators of Medical Regimen Adherence for Myocardial Infarction Patients.** *Nursing Research* 34(5):268-272, September-October 1985.

The relationships between attitudes, intentions (self and perceived beliefs of others), demographic variables (including quantity smoked, sex, age, education, occupation, blood pressure, and weight), and performance of and adherence to a prescribed medical regimen were investigated in 112 myocardial infarct (MI) patients (85 smokers, mean 1.5 packs/day) at time of hospitalization and 6 to 9 months posthospitalization. Multidisciplinary teams instructed patients on dietary restrictions, medications, cessation of smoking, activity progression, and reduction of stress. Multiple regression analysis indicated that during hospitalization, attitudes and perceived beliefs of others were strong indicators of intentions to adhere to the medical regimen, but were not indicators of posthospitalization adherence. In the posthospitalization period, attitudes and perceived beliefs of others were strong indicators of actual regimen adherence. For the demographic variables investigated, no bivariate correlation coefficients were found to be significant in relation to medical regimen adherence and adherence intentions during hospitalization. Findings indicate that rehabilitation plans for MI patients should be individualized for hospital and home and should include data on health belief variables. (Auth. Abs. Mod.)

86–1165. Pederson, L.L.; Baskerville, J.C.; Ashley, M.J., et al. **Comparison of Mail Questionnaire and Telephone Interview as Data Gathering Strategies in a Survey of Attitudes Toward Restrictions on Cigarette Smoking.** *Canadian Journal of Public Health* 76:179-182, May-June 1985.

Mail questionnaire and telephone interview as data-gathering strategies were compared in a population survey on attitudes toward legal restrictions on cigarette smoking in public places. Both had similar response rates and honesty. Reported smoking rates did not differ significantly (telephone 35.9 percent, mail 33.3 percent). Analysis of saliva samples for thiocyanate showed no instance of a report of nonsmoking contradicted by results. However, the telephone interview method was favored for (1) lower cost, (2) frame availability, (3) lack of bias evidence, and (4) speed of data collection. It is suggested that method selection should be based on specific topics to be surveyed and target population. Results support the conclusion that the technique best suited to one topic area and population may be different from that for others. Pilot work directly relevant to the topic and population should be conducted in cases where specific information has not been previously published.

86–1166. Ramprakash, D.; Morris, J. (Editors). **Social Trends, No. 16. 1986 Edition.** London, Her Majesty's Stationery Office, 1986, 225 pp.

In this 16th edition of *Social Trends*, a source of updated information on the changing patterns of British life, the Central Statistical Office provides data on population, households and families, education, employment, income and wealth, resources and expenditures, health and personal social services, housing, transport, communications, and the environment, leisure, participation, and law enforcement. The special focus of the edition is on income after retirement, complementing the chapter on income and wealth. Information on tobacco and smoking shows that the relative importance of tobacco in the index of retail prices declined between 1961 and 1984, reflected in the decline in percentage of total income spent on tobacco (from 4.1 percent in 1976 to 3.4 percent in 1984). The length of time worked needed to pay for 20 cigarettes changed very little: 22 minutes in 1971 vs. 21 minutes in 1984. Although low-income families spent a larger proportion of income on tobacco than middle- and high-income families (4.9 percent, 3.2 percent, and 1.6 percent, respectively), the total spent on tobacco was higher in middle-income families than in low- and high-income families. Data on smoking habits by sex and socioeconomic status show that smoking declined from 33 percent in 1972 to 17 percent in 1984 among male professionals and from 33 percent to 15 percent among female professionals. Among unskilled workers, the number of smokers decreased from 64 percent of men and 42 percent of women to 49 percent and 36 percent, respectively, between 1972 and 1986. The average for all groups fell from 52 to 36 percent among men and from 42 to 32 percent among women. Average weekly consumption declined among men (from 120 to 115 cigarettes/week); however, consumption increased among women, from 87 to 96 cigarettes/week. Results of a 1981 survey found that smokers were consistently less likely than nonsmokers to believe that there was a relationship between smoking and cough, breathlessness, bronchitis, lung cancer, heart disease, and poor circulation. It is noted that since it became mandatory for manufacturers to show the tar content of cigarettes on packages, there has been a switch to low-tar cigarettes. Only 5 percent of cigarettes sold in the last 6 months of 1972 were in the low-to-middle tar category (almost no cigarettes were in the low-tar category), but in 1984, 55 percent of cigarettes sold were in the low-to-middle category and 15 percent were low-tar cigarettes.

86–1167. Ravenholt, R.T.; Pollin, W. **Tobacco Addiction and Other Drug Abuse Among American Youth.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 183-189.

Tobacco smoking is addictive by every important measure of addiction, (i.e., psychoactive effects, habitual use leading to dependence and compulsive abuse, physiological and psychological distress upon discontinuance, and tendency to recidivism). Measured by morbidity and mortality, cigarette smoking is now the most serious and widespread form of addiction in the world. The two main factors that limit the effectiveness of smoking prevention programs are (1) the powerful promotional activities aimed at increasing tobacco sales; and (2) the phenomenon of cigarette addiction. Smoking prevalence increases rapidly during adolescent years (roughly equal increments during junior and senior high school). By the senior year, over 80 percent have experimented with cigarette smoking, and close to one-third become daily users. Daily use of cigarettes by adolescents exceeds daily use of all other drugs combined, and serves as a gateway to use of other psychoactive drugs (i.e., marijuana, alcohol, cocaine, hallucinogens, and heroin). Adolescents who become addicted to cigarettes and smoke 20 cigarettes/day the balance of their lives increase the overall chance of dying tenfold and double the chance of dying during middle age.

86–1168. Ray, J.J. **Smoking and Intelligence in Australia.** *Social Science Medicine* 20(12):1279-1280, 1985.

Highly intelligent people are less likely to smoke than others, according to responses to a postal survey (700 mailed, 402 returned) of Australian Mensa members, suggesting that smoking is a sign of general social disadvantage. Among respondents, 61 of 277 males and 19 of 125 females were smokers (22 and 15 percent, respectively), compared with national averages of 40 and 31 percent, respectively. Prevalence of smoking among Mensa members was lower in all age categories for men, but in only 8 of 10 age categories for women. It is noted that the numbers in the two deviant age categories (45 to 49 and 60 to 69) were very small (9 and 4, respectively). (Auth. Abs. Mod.)

86–1169. Rickard-Figueroa, K.; Zeichner, A. **Assessment of Smoking Urge and Its Concomitants Under an Environmental Smoking Cue Manipulation.** *Addictive Behaviors* 10:249-256, 1985.

The construct validity of smoking urge was supported in an examination of environmental smoking cue manipulation effects on subjective smoking urge ratings and on physiological, behavioral, and cognitive responses hypothesized to relate to smoking urges. Preliminary results indicated that measures of physiological response, cognitions, and behavior vary with urge to smoke. Higher physiological indices and closer association between specific cognitive measures and smoking urges occurred under cue exposure manipulation. Participants were 24 female and 24 male student volunteers who neither sought professional help nor engaged in self-regulated attempts to quit smoking within the past year. Mean nicotine intake/day was 14 to 24 mg. Participants were divided into two groups and matched for sex and age, daily smoking rate, and number of smoking years. Each group underwent an exposure to smoking cues condition and a nonexposure condition, and order of conditions was counterbalanced across participants. It is concluded that deliberate investigation of and intervention with hypothesized construct of smoking urge and its concomitants may enable clinicians to more clearly understand precursors of smoking response and to ultimately decrease relapse rates. (Auth. Abs. Mod.)

86–1170. Rogers, W.R. **Effects of Cigarette Nicotine Content on Smoking Behavior of Baboons.** *Addictive Behaviors* 10:225-233, 1985.

Baboons, like people, prefer to smoke cigarettes with a high nicotine content. Smoking characteristics of 11 baboons (trained to smoke cigarettes for water rewards) indicated that animals regulated nicotine exposure by modifying puffing behavior (not unlike human behavior). Relative to moderate-nicotine cigarettes, animals took significantly ($p < .05$) more puffs on high-nicotine cigarettes and puffs were significantly larger in volume. Baboons registered the same number of puffs on low-nicotine as on moderate-nicotine cigarettes, but volume of puffs were significantly smaller. Levels of cotinine (primary metabolite of nicotine) in animal urine samples varied significantly and were directly related to cigarette nicotine content. Effects of nicotine on cigarette smoking behavior are of interest because (1) important questions concerning the role of nicotine as a reinforcer of cigarette smoking remain unanswered; (2) health effects of nicotine on coronary heart disease, arteriosclerosis, and chronic obstructive pulmonary disease are currently of great concern; and (3) the apparent behavioral effects of nicotine may be a confounding factor in efforts to develop less hazardous cigarettes. (Auth. Abs. Mod.)

86–1171. Szalai, J.P.; Allon, R.; Doyle, J., et al. **EEG Alpha Reactivity and Self-Regulation Correlates of Smoking and Smoking Deprivation.** *Psychosomatic Medicine* 48(1/2):67-72, January-February 1986.

Cigarette smoking was associated with decreased alpha suppression to a vigilance task, but no consistent role of smoking in alpha self-regulation was found. The 12 nonsmokers, 10 ex-smokers, 10 deprived smokers (2 to 3 hours), and 10 nondeprived smokers were exposed to a short-term (18 sec) vigilance task and underwent 6 minutes of biofeedback-assisted alpha amplitude enhancement and suppression training to examine the effects of past and current smoking behavior and cigarette deprivation on alpha amplitude changes. It was expected that alpha amplitude changes in deprived and current smokers would be the most dissimilar to those of nonsmokers (controls). Results do not support a coherent model explaining the effects of smoking on electroencephalograph (EEG) activity. Cigarette smoking did not emerge as a general stimulant or a general depressant of cortical activities; rather, smoking seems to effect EEG activity in ways that are specific to the purposeful, goal-oriented behavior the smoker displays at the time. (Auth. Abs. Mod.)

86–1172. Van Tuinen, M.; Land, G. **Smoking and Excess Sick Leave in a Department of Health.** *Journal of Occupational Medicine* 28(1):33-35, January 1986.

A survey of 406 employees of Missouri's Department of Health found that the 77 smokers took an average of 0.7 hours more sick leave/month than nonsmokers ($p<0.05$). The 11 pipe and cigar smokers used an average of 7.4 hours/month sick leave, a difference from nonsmokers of 72 percent ($p<.05$). Combined, cigarette and pipe smokers showed a significant increase (23 percent, $p<.05$) in use of sick leave. An examination by sex, marital status, and age also showed that smokers took more sick leave than nonsmokers. Differences were pronounced for men, unmarried people, and the group aged ≥ 40 years in that these smokers took 22 to 38 percent more sick leave than their nonsmoking counterparts. Female smokers who were married and ≤ 39 years of age took 5 to 15 percent more sick leave than nonsmokers. Smokers used 1.5 times more days of sick leave/year on average than nonsmokers during the 20-month study, at an estimated cost of 11.9 thousand dollars/year. (Auth. Abs. Mod.)

86–1173. Yates, A.J.; Thain, J. **Self-Efficacy as a Predictor of Relapse Following Voluntary Cessation of Smoking.** *Addictive Behaviors* 10:291-298, 1985.

Self-efficacy score successfully identified individuals at high risk of relapse after voluntarily quitting smoking. It is proposed that remedial measures applied prior to the decision to quit may reduce the probability of relapse in this group. In 32 persons who were administered the same variables shortly after quitting smoking and before eventual status was known, discriminant function analysis of 11 variables showed that a 14-item self-efficacy questionnaire total score was as successful in classifying abstainers or relapsers as analyses involving all 11 variables or their best combination. At the 4-month followup, the self-efficacy total score predicted the status of 15 relapsers and of 7 abstainers. At 8-month followup, the predictive power of the self-efficacy measure was maintained. At both followup points the self-efficacy measure proved superior to other measures. Self-efficacy refers to efficacy in dealing with one's environment. Judgments of self-efficacy also determine how much effort people will expend and how long they will persist in the face of obstacles or aversive experiences. (Auth. Abs. Mod.)

See also, **86–1116, 86–1202, 86–1244**

SMOKING PREVENTION AND INTERVENTION

86–1174. Bailey, B.J. **Give a Priceless Gift This Year.** *Archives of Otolaryngology* 111(12):777-778, December 1985.

Preventive medicine, particularly physician intervention into lifestyles of patients who are in danger of losing their health from smoking, is discussed. After alerting the patient to dangers of smoking, and provided the patient has expressed a desire to quit smoking, the physician's role is to reinforce and support the patient's decision. A plan of action could include the following suggestions for new behavior patterns: (1) limiting purchase of cigarettes to a given number each day or each week; (2) limiting number of cigarettes smoked each day; (3) identifying a separate place at home and at work for smoking and abstaining from smoking in all other locations; (4)

and limiting all other activities while smoking to concentrate on that event. The physician should also review the patient's progress periodically and provide support and encouragement. For some patients, it might be necessary to establish written rules and a daily checkoff list or diary. Throughout the program, it is important that the physician warn the patient of "rough spots" in substituting good behavior for bad behavior, and encourage the patient by stressing the ultimate benefit of better health.

86–1175. Best, J.A.; Flay, B.R. **The Waterloo Smoking Prevention Project: Methodological Advances, Results, and Empirical Guidelines for Dissemination to the Schools.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 649-655.

Significantly fewer adolescents who participated in the Waterloo Smoking Prevention project in sixth grade were smokers in eighth grade than among students who did not participate ($p<0.05$), confirming the expectation that sixth grade is a major period of smoking onset and the best time for a prevention program. Before the program, 75 percent of students had never smoked or had tried it only once (12 percent quitters, 9 percent experimenters, and 3 percent regular smokers). Two and one-half years later, program students were smoking significantly less than those not exposed. Experimental smoking did not increase in sixth grade. At the end of eighth grade, 1.8 times as many controls as treatment students were experimental smokers and 53 percent of never smokers in the control group and 40 percent of never smokers in the treatment group had tried smoking at least once ($p<.08$). Experimental condition children were more likely to quit after the second cigarette and less likely to go on to regular smoking ($p<.02$). Immediately following the program, 68 percent of the treatment group quit smoking compared with 22 percent of controls ($p<.005$). Of the quitters, 42 percent of pretest experimenters maintained abstinence throughout followup.

86–1176. Bjartveit, K. **Effect of Intervention on Coronary Heart Disease Risk Factors in Some Norwegian Counties.** *American Journal of Medicine* 80(2A):12-17, February 14, 1986.

Results of a cardiovascular disease screening and intervention program, operating in three Norwegian counties since 1974, are presented. The program, which operates through the National Health Screening Service, consisted of two screenings, 3 to 5 years apart, to identify cardiovascular disease risk factors in all county residents aged 35 to 49 years and in representative samples of residents aged 20 to 34 years. Intervention was provided by local general practitioners and public health nurses following each screening. Results are presented for Finnmark and Sogn og Fjordane counties, which represent extremes in ischemic heart disease mortality. At the first screening, the percentage of daily smokers was substantially higher in Finnmark County. Mean serum cholesterol levels (also higher in Finnmark) and differences in smoking habits were thought to account for the difference in ischemic heart disease mortality between the two areas. At the second screening, smoking rate was lower among men in both counties but was relatively unchanged among women. A risk score for myocardial infarction within 10 years, which included values for cholesterol, systolic blood pressure, and cigarette smoking, showed a reduction of approximately 20 percent for males aged 35 to 49 years in Finnmark County.

86–1177. Bozan, M.; Favaretti, C.; Giotto, J., et al. **"Fumee ou Sante": Une Experience Pilote Pour l'Education a la Sante Dans Une Communaute Rurale de l'Italie du Nord-Est (Campagnola Emilia). ["Smoking or Health": A Pilot Experiment for Health Education in a Rural Community of Northeast Italy (Campagnola Emilia).]** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 341-345, French.

A pilot health education experiment conducted among 2,897 residents of a small Italian community (Campagnola Emilia) revealed a lack of awareness of the health hazards of tobacco use. The project, to assess smoking habits prior to developing an elaborate smoking intervention strategy, was inspired by the National Association of General Practitioners. Questionnaires were sent to all residents ≥ 14 years of age. Among men who completed the questionnaire, 36.1 percent were smokers and 41.7 percent were nonsmokers. Among women, 42.4 percent were smokers and 33.6 percent were nonsmokers. Most smokers (84.6 percent) and nonsmokers (90.5 percent) were aware that tobacco had negative effects. However, smokers were more aware that tobacco-related health effects may differ among cigarette, pipe, or cigar smokers. With regard to smoking by children, 93 percent (more smokers than nonsmokers) did not approve, but most would not forbid children to smoke. Information on the health effects of tobacco use was primarily from the mass media and to a lesser degree from health professionals. Posters, information at schools, and antismoking campaigns contributed very little.

86–1178. Brandt, E.N., Jr. **Smoking: The Number One Health Problem.** *Maryland Medical Journal* 34(9):897-898, September 1985.

Cigarette smoking, society's largest single killer, is responsible for more than 340,000 deaths/year. Physicians can prevent illness, disability, and premature death associated with smoking by therapeutic intervention. Prescribing nicotine for a smoker, and then gradually reducing it over time is a promising form of therapy. Bantron, Nicorette chewing gum, and other smoking cessation products have been associated with successful results. Stopping smoking must be positively reinforced by the family, coworkers, and friends. It is also important that positive aspects of smoking cessation be stressed, e.g., chronic nasal and laryngeal irritation will subside, taste will be enhanced, and exercise tolerance will improve. Local smoking restrictions are also helpful. Extra effort required to smoke in designated areas or outside an area may reduce the physiological cravings for a cigarette. Fear of weight gain can be relieved through proper nutrition training. Physicians have a responsibility to help people stop smoking. Therapeutic intervention is possible, and it does work.

86–1179. Chen, T.T.L.; Winder, A.E. **Teachers' Perceptions Related to Smoking Education Between 1973 and 1982.** *Journal of Drug Education* 15(2):125-137, 1985.

Percepticoncernings of public school teachers concerning student smoking and smoking education studied in 1973 and 1982 revealed that (1) relatively little change has occurred in smoking education and (2) teachers who smoke were more resistant to participating in antismoking education programs than nonsmokers. Recommendations included (1) development of in-service education programs; (2) establishment of curriculum units on prevention of smoking in teacher education institutions; and (3) workshops for teachers who smoke to solicit cooperation. A comparison of smoking status of teachers in 1973 and 1982 revealed fewer current smokers (26.7 percent vs. 19.7 percent) and a greater number of nonsmokers (45.8 percent vs. 52.7 percent). A successful school smoking education program, it is proposed, requires collective efforts from all teachers in the school system. In-service teacher training workshops and smoking cessation assistance for teachers who smoke are considered important in any school smoking education program. It is suggested that classroom teachers could design and implement more effective units on smoking education by cooperating with community agencies already having resources and personnel available for smoking education programs.

86–1180. Connell, D.B.; Turner, R.R.; Mason, E.F. **Summary of Findings of the School Health Education Evaluation: Health Promotion Effectiveness, Implementation, and Costs.** *Journal of School Health* 55(8):316-321, October 1985.

Health education had a significant effect in deterring initiation of smoking among seventh graders, but from 40 to 50 hours were required to develop healthy attitudes and practices. Self-report data from a recent School Health Education Evaluation relating overall knowledge, attitude, practice, and program-specific knowledge with program implementation and cost showed that almost three times as many students in regular classrooms began smoking in the first half of seventh grade as students attending a health classroom. The 20-State evaluation, involving 30,000 children (grades 4 to 7) in 1,071 classrooms, assessed school health education since 1964. Classes that were taught health increased their knowledge subscores 4.2 to 6.8 percent over classrooms where there was no health program, with greatest differences recorded for substance use and abuse knowledge. By midyear, less than 8 percent of seventh grade health classroom students reported starting smoking compared with 12 percent of students not attending a health classroom. Students in health program classrooms reported healthier attitudes, particularly toward maintaining a healthy body and in decisionmaking skills. Implementation costs (those associated directly with number of classroom instruction hours) accounted for more than 90 percent of total costs and were related to program effectiveness. (Auth. Abs. Mod.)

86–1181. Fisher, D.A.; Armstrong, B.K.; De Klerk, N.H. **A Randomised-Controlled Trial of Education for Prevention of Smoking in 12 Year Old Children.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 263-270.

A seventh grade smoking prevention program, patterned after the Minnesota peer-led social consequences curriculum, was implemented in West Australian primary schools with 1,953 children. Results showed that (1) a teacher-led program reduced smoking initiation among nonsmokers of both sexes during the first year of high school; (2) a peer-led program of identical design probably had a similar effect in females but appeared to be ineffective in males; (3) neither program increased the frequency with which smokers quit smoking in the succeeding 12 months; and (4) apart from program effects, intention with respect to future smoking, friends' smoking habits, perceived susceptibility to peer pressure, and strength of response to cigarette advertisements were significant predictors of smoking in males. Intentions with respect to future smoking and peer pressure to smoke were significant predictors of smoking in females.

86–1182. Fowler, G.; Jamrozik, K. **The "Beliefs" and "Activities" of GPs and Health Visitors About Anti-Smoking Education.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 271-280.

General practitioners (GPs) and public health nurses surveyed on antismoking beliefs and activities indicated that GPs should be more involved in efforts to curb smoking than public health nurses. GPs felt they should set a nonsmoking example (84 percent), make public statements against smoking (44 percent), exert pressure on members of Parliament (MPs, 28 percent), and pressure the Government through professional organizations (64 percent). Despite almost 30 percent expressing GP activism, only one doctor reported writing to his MP regarding smoking. None of the public health nurses had done so. Approximately two-thirds (62 percent) of the GPs compared with only 10 percent of public health nurses claimed that smoking status of patients was usually recorded. GPs who were smokers were less in favor of the role-setting example or of exerting pressure on the Government. The Oxford study questionnaires were completed by 208 GPs (22 percent current smokers, 39 percent ex-smokers, and 39 percent never smokers) and 106 public health nurses (7 percent current smokers, 30 percent ex-smokers, and 63 percent never smokers).

86–1183. Gauthier, J. **Monigo. Programme d'Intervention sur le Tabagisme Pour les Enfants de 5 a 12 Ans. [Monigo. Tobacco Intervention Program for Children Aged 5 to 12 Years.]** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 281-286, French.

An intervention program designed to motivate primary school children against tobacco beginning in kindergarten is being pretested in 1,278 Canadian schools with 252,674 students. The program, divided into seven stages corresponding to grade level, utilizes peer-prepared materials (slides, film, brochures, and pamphlets) to inform children aged 5 to 12 years about the dangers of tobacco use. Data show that 30 percent of males and 34 percent of females in Quebec try cigarette smoking before 9 years of age. Antismoking efforts, although somewhat effective for adults, have proved ineffective for children mostly because motivations differ between the two groups, e.g., children like to imitate adults. The new approach, inspired by the Quebec Pulmonary Association, tailors antismoking messages to each grade level: Steps 1 and 2 (kindergarten and first grade) instill an antitobacco awareness; steps 3 and 4 (second and third grade) create a nonsmoker consciousness; step 5 (fourth grade) stresses implications of being a nonsmoker; step 6 (fifth grade) encourages formation of nonsmoker groups; and step 7 (sixth grade) teaches respect for nonsmoker rights. A more detailed description of the program is given, using step 5 (fourth grade) as an example. Monigo is an acronym for carbon monoxide, nicotine, and tar, the three primary constituents of tobacco smoke.

86–1184. Gritz, E.R. **The Challenge to Public Education: A Multi-National Perspective.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 301-310.

Public education must increase its scope and content to include the sociocultural context of smoking behavior as well as its disease consequences. The fact that 50 to 60 million people in the United States still smoke after almost 20 years of public education efforts and smoking in developing countries promises to follow the patterns of developed nations is further evidence of lack of power in education. Dramatic examples exist of school-based prevention programs that work because they deal with the psychosocial context of behaviors, e.g., peer pressure, adult role models, and media pressure. For adult women, concerns that prevent them from quitting (weight gain and modulation of the negative effect) should become specific program objectives. Adult-oriented materials should be developed to show women how they are being exploited by advertising and tobacco corporate executives who equate their femininity, modern role status, and buying power with a cigarette in hand. Particular information or aids in the form of tailored materials might be directed at important target groups, including women at high risk for smoking-related diseases, women with carcinogen-related occupational exposures, pregnant women, or women with family histories of cardiovascular or respiratory diseases. Self-help cessation through specific program modules might encourage more smokers to quit on their own.

86–1185. Hastings, G.B.; Leathar, D.S. **The Mass Media in Health Education. The Need for Audience Involvement.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 311-317.

The mass media should be seen by health educators as operating in conjunction with, rather than as an alternative to, other health education activities. The strengths and weaknesses of the mass media should be recognized to ensure that appropriate objectives are set and steps are taken to maximize its potential. The latter depends on use of consumer research and targeting. Personal relevance (matching of the material with the perception of the target group) is examined in two steps: (1) getting the audience's attention, and (2) generating and maintaining audience involvement. An antismoking film directed at adolescents based health education material on a style of humor considered relevant to this age group. Younger viewers (<15 years of age) found the film amusing but confusing; viewers 16 to 18 years of age reacted positively and confidently. For the older group, the material had a beneficial effect in terms of impact, interest, and relevance. The innovative style overcame a fundamental weakness of the mass media (lack of relevance to the individual), but also proved problematic in that the novel style undermined basic communication objectives (the facility to reach a mass audience).

86–1186. Hjermann, I.; Holme, I.; Leren, P. **Oslo Study Diet and Antismoking Trial. Results After 102 Months.** *American Journal of Medicine* 80(2A):7-11, February 14, 1986.

Data collected at the 102-month followup examination of the Oslo Study Diet and Antismoking Trial are reviewed. The trial initially involved 1,232 healthy men (aged 40 to 49 years) at high risk for coronary heart disease and with serum cholesterol values ranging from 7.5 to 9.8 mmol/L. Eighty percent of the men were daily cigarette smokers and all were normotensive (i.e., systolic blood pressure <150 mm Hg). After 5 years of intervention, daily cigarette consumption was significantly lower in the intervention group compared with the control group; however, consumption increased after intervention, with daily values at 102 months approaching those of the control group. Results indicate that even after many years, ex-smokers tend to resume smoking. Mean serum cholesterol levels in the intervention group remained unchanged, but cholesterol levels in the control group declined. Incidence of fatal and nonfatal myocardial infarction and sudden coronary death was the same as at the end of the 5-year trial, with significant differences between the two groups for sudden death, total coronary death, and total coronary events. It is concluded that a significant preventive effect on coronary heart disease was achieved by altering the eating and smoking habits of members of the intervention group, even though some of the alterations were transient.

86–1187. Khor Kok Peng, M. **The Urgent Need to Control the Smoking Epidemic in the Third World.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 561-566.

Third World countries account for 52 percent of worldwide tobacco consumption, 58 percent of exports, and 61 percent of the worldwide tobacco output. Although smoking is declining in developed countries, efforts to resist the spread of tobacco use within Third World countries are hampered by lack of awareness of smoking hazards and absence of antismoking and health groups. Many Third World governments depend on tobacco taxes for revenue, and are thus reluctant to restrict tobacco companies. In Malaysia, the Consumers' Association of Penang (with the backing of the Malaysian Medical Association) launched an antismoking campaign calling for (1) a total ban on all forms of tobacco promotion; (2) ban on cigarette sales to children; (3) ban on selling cigarettes and on smoking in enclosed public places; (4) health education of children on hazards of smoking; (5) smoking and health education films on government-run radio and television; (6) an end to expansion of tobacco cultivation and a phaseout of present tobacco cultivation; (7) a tax increase on cigarettes, to be used for health education; and (8) health education of the general public through films, slides, pamphlets, posters, counter advertisements, and other methods.

86–1188. Ledwith, F. **Immediate and Delayed Effects of Postal Advice on Stopping Smoking.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 383-387.

Leaflets on how to stop smoking provided routinely by Scottish health education authorities (the most widely used "treatment" against smoking) were compared with a costlier individualized correspondence method (made possible by the advent of word processors). The 1,838 smokers recruited by advertisements in working class newspapers were randomly assigned to (1) control; (2) leaflet with standard letter; or (3) individualized help by correspondence. At 12-month followup, more than 40 percent of all clients reported having quit smoking, but two-thirds had relapsed. Men showed a greater gain from individualized advice than women ($p<0.025$). Individualized advice produced a statistically significant increase of 3.9 percent in rate of maintained cessation within 2 months of contact compared with 1.7 to 1.9 percent in the control and leaflet groups, respectively. At 6-month followup, results in the leaflet group were better than in the control group ($p<.05$). The group receiving individualized advice showed no significant gain.

86–1189. Linthwaite, P. **Health Warnings.** *Health Education Journal* 44(4):218-219, 1985.

When Australian smokers were asked to rate the existing warning on cigarette packages (Cigarettes can seriously damage your health) and five others (Smoking is addictive; Smoking damages your lungs; Smoking causes lung cancer and heart disease; Smoking kills; and Stopping smoking now greatly reduces risks to your health), "Smoking kills" was voted the warning with the most deterrence, particularly if placed on the front of the package. The overall finding was that health warnings on cigarette packs do have an impact, but the existing warning was not effective because of governmental attribution, and partly because the equivocal "can" enables smokers to direct the message away from themselves. "Smoking kills" was short and had shock value, according to 56 evaluators (12 nonsmokers), who added that they would find it difficult to buy a pack of cigarettes that carried this message or to offer cigarettes to others if the warning appeared on the front of the pack. "Smoking is addictive" was rated most persuasive, while "Stopping smoking now greatly reduces risks to your health" the least, primarily because the message was too long and confusingly phrased. Rotation and positioning of warning labels were said to be important factors. All believed that warnings placed on the front of the pack had more force.

86–1190. Marwick, C. **Many Brands of Cessation Plans Lure Smokers.** *Journal of the American Medical Association* 255(8):998-999,1004, February 1986.

Smoking cessation programs are finding willing audiences and voluntary and commercial groups designed to help smokers quit are increasing. The Department of Health and Human Services publishes a guide to more than 400 State and local programs devoted to smoking cessation. Two of the many nonprofit programs are Fresh Start (American Cancer Society) and Freedom from Smoking (American Lung Association). Clinics run by the lung association report that 12-month abstinence rates have been climbing steadily (11 percent in 1981 to just under 33 percent in 1983). However, success rates for industry-based antismoking clinics are higher than for of community-based programs (63 and 43 percent, respectively). Smokenders, a profit-making organization that sells its programs to industry and the public, claims a success rate of 80 percent (defined as those who have successfully completed the program and quit smoking). Incentives (particularly for "hard-core" smokers) can be valuable tools, especially in workplace programs. The one-on-one approach to smoking cessation works best when the contact is between a physician and a smoker; people prefer to get advice about health from their physician. Physicians are urged to develop skills in guiding patients through the quitting process.

86–1191. McCaul, K.D.; Glasgow, R.E. **Preventing Adolescent Smoking: What Have We Learned About Treatment Construct Validity?** *Health Psychology* 4(4):361-387, 1985.

The construct validity of successful adolescent smoking prevention programs lacks thorough understanding, a problem that results primarily from neglect of process assessment and analyses. In many studies (1) assignment procedures have not been randomly employed; (2) implementation of treatment (but not data analysis) has been at the level of entire schools, thus confounding condition and school; (3) use of time frame makes uncertain whether programs actually prevent or just delay smoking onset; and (4) occurrence of dropouts over followup periods has been significant. Numerous programs introduced to prevent adolescent smoking have demonstrated some success. How and why programs reduce adolescent smoking is examined. The advantages and disadvantages of several future research approaches are discussed, including (1) utilization of process measures within large scale treatment/no treatment designs; (2) small-scale studies to test the effects of prevention components on process measures (e.g., attitudes, intentions to smoke); and (3) combinations of these two approaches. (Auth. Abs. Mod.)

86–1192. Moreton, W.J.; East, R. **What Quitters Need to Know.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 397-401.

Beliefs and feelings about quitting smoking differ substantially between the sexes and separate health education messages must be considered for men and women. For a man, the length of abstinence may be predicted from personal obligation (i.e., what a man feels he ought to do), which seems to relate to personal attitude. For a woman, the major influence appears to be perceived social pressure (i.e., what she perceives other people think she should do). Men appear to have taken into consideration what others think when forming their attitude, but as there is no direct correlation of perceived social pressure with duration of abstinence, men appear to act according to their personal attitudes and not perceived social pressures. Women do not seem to link the gains and losses of quitting to pressure from other people. Their behavior is related to a generalized response to do what other people think they ought to do. Health education for men might stress specific health issues, especially heart disease, while women need to feel confident that they will be able to cope with interpersonal situations if they become successful quitters. This difference in influence between the sexes may help explain the differential success in quitting rates. Social support is more changeable than beliefs about medical consequences of smoking.

86–1193. Nater, B.; Gutzwiller, F.; Abelin, Th., et al. **Evolution de la Consommation de Tabac dans 2 Villes d'Intervention et 2 Villes Temoins Suisses. [Changes in Tobacco Consumption During a Community Oriented Primary Prevention Program in Switzerland.]** *Revue de Epidemiologie et de Sante Publique* 33:80-89, 1985, French.

The National Research Program on primary prevention of cardiovascular disease in Switzerland found that community health education can be effective in preventing the health consequences of smoking. Two French-speaking communities (12,000 inhabitants each) and two German-speaking communities (16,000 inhabitants each) were selected for intervention and comparison. Baseline screening in 1977 (stratified random samples) was followed by the community intervention program (1978 to 1980). Final assessment of initial participants was performed at the end of 1980. Among regular smokers, 26.2 percent quit in intervention communities compared with 18.1 percent in the reference cities. Of nonsmokers, 4.7 percent began to smoke in the intervention communities compared with 7.8 percent in the reference cities. Smoking status was determined by plasma thiocyanate measurement. (Auth. Abs. Mod.)

86–1194. Penev, S.G.; Penev, L.G. **Early Prophylaxis of Smoking.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 415-418.

Psychoimmunization (creating a conditioned reflex against smoking) is being used as a smoking control program among 2,000 kindergarten children (and 4,000 parents) throughout Bulgaria. An aversion or unpleasant association toward tobacco is created through means as simple as blowing smoke into a child's face once a month. The protective conditioned reflex (i.e., smoke repulsion, nose and eye irritation, cough) associated with first contact with cigarette smoke is reinforced and, if successful, fixed. Results indicate that children are not harmed in any way, and parents (particularly smokers) unanimously agree with the program methods and objectives. The concept of psychoimmunization, developed more than 30 years ago, is supported by the Bulgarian Ministry of Health.

86–1195. Pertschuk, M. **Creative Uses of Communications Media in Smoking.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 331-335.

Skilled, imaginative, and strategically planned public health media campaigns that can reinforce the trend toward cessation of smoking should (1) increase public awareness of the dangers of smoking; (2) inform community leaders, health authorities, government officials, and politicians of the need for smoking control programs; (3) reach young people to counter the protobacco culture promoted by advertising and peer pressure; (4) persuade adult smokers of the benefits of quitting; (5) analyze and criticize the activities and propaganda of the cigarette industry; (6) raise the consciousness of nonsmokers to their rights to breathe unpolluted air; (7) contribute to public attitudes that view nonsmoking as normal social behavior; (8) inform the public about critical facts concerning cigarettes, such as benefits and risks of lower tar and nicotine cigarettes; (9) propose a national agenda for smoking control, legislation, and regulation and build public support for such legislation; (10) publicize success stories of individuals and groups who have quit smoking, including health benefits enjoyed; and (11) provide encouragement and assistance to smokers who want to quit.

86–1196. Ramstrom, L.M. **Public Education Programs.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 343-354.

Among the objectives of smoking control programs should be that (1) decisionmakers and the public understand the urgency of a reduction in smoking; (2) young people do not start smoking; (3) smokers stop smoking; and (4) the social climate promotes nonsmoking as the norm. Public education is fundamental for each objective. Legislation or medical treatment may be a necessary supplement. Educational methodology relies not only on knowledge, but also on attitudes and behavior (i.e., smoking habit initiation, maintenance, and discontinuation), including social and economic factors. A positive approach, emphasizing the favorable aspects of nonsmoking, should be adopted. Implementation requires utilizing existing infrastructures (school systems, health care systems, and health organizations) and providing professionals of each group a key role in incorporating educational tasks into daily routines. Specific training and teaching aids are suitable for assisting health professionals to form effective networks through which everyone can be reached. Evaluation should include smoking rates and effects of intervention on changes in attitudes and beliefs. It should also cover the technical construction of the program and any necessary revisions. (Auth. Abs. Mod.)

86–1197. Ramstrom, L.M. **Smoking Control in Developing Countries—Support by WHO and SIDA (Swedish International Development Authority).** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 581-587.

Smoking control problems in developing countries are addressed, beginning with a brief review of the actions of the World Health Organization (WHO) and the Swedish International Development Authority (SIDA). In response to the 1980 World Health Assembly resolution, goals of a WHO program for worldwide health promotion and prevention and control of tobacco-related diseases are to (1) establish and expand comprehensive, long-term smoking control programs; (2) develop and make available model procedures for smoking control; (3) facilitate implementation of smoking control programs; (4) improve and expand monitoring and evaluation efforts; and (5) establish, develop, and expand international activities, especially WHO-led collaboration between United Nations agencies. WHO-SIDA conferences and workshops on smoking and health have enabled delegates from Third World countries to meet regularly to exchange experiences and to resolve problems. Some current problems discussed are (1) interpretation of cigarette sales statistics, (2) education of legislators and health professionals, (3) analysis of the economic role of tobacco (taxation vs. loss of jobs, production vs. consumption), and (4) implementation of crop substitution.

86–1198. Raw, M.; Heller, J. **Smokers' Clinics in Britain. A Descriptive Survey.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 433-437.

Evaluation of smokers' clinics in Britain and Northern Ireland, which were rated on staffing, methods, and outcome after 10 years of operation, showed that performance could be improved 30 to 35 percent through more rational planning that integrated their efforts with those of other health workers in the community. It was estimated that the 56 clinics serving 17 million smokers were too few and not accessible to most smokers wishing to quit. To increase the success rate (estimated to be only 15 to 20 percent) and to close the gap between latest techniques developed through research and those applied in smokers' clinics, the study recommended thorough revamping, including staff training in more effective methods. Among functions recommended for clinics are (1) servicing dependent smokers, particularly as resources for physician referral; (2) training health professionals in smoking cessation counseling, and (3) providing a more visible antismoking commitment of the health authority.

86–1199. Reid, D.; Harris, J.; Jacob, M., et al. **Smoking Education in the United Kingdom With Special Reference to England, Wales, and Northern Ireland.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 355-360.

In 1982, fewer men and women (>15 years of age) in the United Kingdom were smoking (38 and 33 percent, respectively) and fewer cigarettes were sold than in 1972, when 52 percent of men and 41 percent of women were smokers. The decline is attributed to health education. In 1970, 127,900 million cigarettes were sold compared with 102,000 million in 1982. An increase in the cigarette tax in 1981, a decline in real disposable income, and a health education campaign led to the reduction in smoking prevalence and consumption. Little credit is given to antismoking legislation, since the only relevant laws enacted (a ban on television advertising and sales to children <16 years of age) were either circumvented or ignored. The health education movement, spearheaded by Action on Smoking and Health (a Scottish health education group), worked to discredit the image of smoking. Cessation techniques and health promotion messages received lower priority. The children's program (PRECEDE) involves (1) listing influences that predispose, enable, and reinforce children's smoking; (2) identifying influences that help health education make an impact; and (3) devising appropriate strategies for each influence. The adult's program (Give Up Smoking) concentrates on providing advice to smokers who wish to quit and support from health professionals. Specific smoking cessation activities for groups (e.g., adolescents and pregnant women) are described.

86–1200. Sanders, D.J.; Stone, V.; Fowler, G., et al. **Practice Nurses and Antismoking Education.** *British Medical Journal* 292(6517):381-383, February 1986.

In a survey of attitudes toward education about smoking, 77 percent of general practice nurses favored training in antismoking education, listing information about smoking, techniques for stopping, and counseling skills as priorities. Although 92 percent thought that they had an important role in helping smokers quit, 65 percent expressed little confidence in their effectiveness, believing that advice from the general practitioner and the smoker's personal determination to give up have more impact. Approximately 80 percent of 369 nurses surveyed responded to a questionnaire on antismoking activities and education. Only 12 percent reported smoking; however, the low figure may reflect a low response from smokers. Results indicate that antismoking activities do not occur regularly, despite the interest of nurses in antismoking education. Antismoking advice was given only occasionally, although there was more discussion with smokers at risk. In general, nurses did not regularly refer smokers to the general practitioner or outside agencies for help, recommend nicotine chewing gum, or use health education literature.

86–1201. Schinke, S.P.; Gilchrist, L.D.; Snow, W.H., et al. **Skills-Building Methods to Prevent Smoking by Adolescents.** *Journal of Adolescent Health Care* 6(6):439-444, November 1985.

Smoking prevention methods with sixth grade students, analyzed for effectiveness, showed that skills-building resulted in the most favorable attitudes toward nonsmoking at both measurement periods. Methods used consisted of (1) pretest, skills-building, posttest; (2) pretest, discussion, posttest; (3) pretest and posttest; and (4) posttest only. The skills-building group had higher posttest and 6-month scores for resolving tobacco use problems and for anticipating consequences of nonsmoking decisions. Students exposed to skills-building and discussion knew more facts about cigarette use at posttest and 6-month followup. Pretest to posttest percentage of those who reported ever smoking rose 1.9 percent in the skills-building group, 5.0 percent in the discussion group, and 2.5 percent in the pretest-posttest group. Percentage of students who reported ever smoking from posttest to 6 months did not change for the skills-building group, but increased by 4.9, 5.8, and 5.1 percent for the discussion, pretest-posttest, and posttest only groups, respectively. Ever-smoking rates from 6 to 15 months rose 2.4 percent in the skills-building group, 11.2 percent in the discussion group, 9.6 percent in the pretest-posttest group, and 11.0 percent in the posttest only group. Noncigarette tobacco use at 15-month followup was reported by 4.0 percent of the skills-building group, 14.5 percent of the discussion group, 4.6 percent of pretest-posttest group, and 21.4 percent of the posttest group.

86–1202. Tahy, A. **The Role of Legislation, Health Education and Social Organizations of a Socialist Country in the Battle Against Smoking.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 361-366.

Health education, legislation, and efforts of social organizations have failed to make an impact on the growing prevalence of smoking in Hungary. Factory workers have the highest smoking rate (75 percent). Among men, 80 percent of blue-collar and 71 percent of white-collar workers are smokers; among women the proportions are 70 percent and 63 percent, respectively. In schools where the proportion of teachers who smoke is high, the proportion of students who smoke is also high. Comparison with the North Karelia project of an antismoking campaign held in one county of 360,000 inhabitants indicated that in future programs (1) the role of health professionals, particularly public health nurses, needs to be emphasized; (2) better strategies need to be incorporated to prevent contradictory results (70 percent of schoolteachers felt "the propaganda against smoking was unnecessary"); (3) positive effects of smoking cessation (as opposed to negative effects such as diseases and death) need to stressed,; and (4) use of mass media is essential.

86–1203. Wijatkowski, S. **Anti-Tobacco Educational Film in the Light of Receivers' Opinion: 13-15 Year Old Youths.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 367-370.

Attitudes of Polish adolescents (13 to 15 years old) toward smoking were surveyed by the National Antismoking Center to establish criteria for designing a new antitobacco film. Although smoking prevalence has declined since 1979, 19.3 percent of boys and 8.4 percent of girls admitted to smoking regularly. It was determined that only 43.4 percent of boys and 40.0 percent of girls had ever seen an antitobacco film. Of those who had seen such a film, 75.0 percent of boys and 86.6 percent of girls thought that they had learned something interesting. Data showed that 50.0 percent of boys who had smoked in the past but were not current smokers and who had already seen an antitobacco film thought a film should give scientific information on the harmfulness and consequences of smoking; 25 percent felt that the film should explain how to stop smoking and 16.6 percent suggested showing positive examples of nonsmokers and advantages of not smoking. Of girls who were not current smokers, 52.8 percent favored scientific evidence as a source of knowledge, 18.4 percent wanted to see positive examples of individuals without a cigarette, and 15.8 percent thought that the film should emphasize harmfulness of smoking and condemn behavior of people who say that smoking is harmful but who continue to smoke. It was concluded that the new antitobacco film should (1) be addressed to the young; (2) give scientific information about the harmfulness and consequences of smoking; (3) have a serious story and style; and (4) last about 30 minutes and not less than 15 minutes.

See also, **86–1120**

SMOKING CESSATION METHODS

86–1204. Bourne, S. **Treatment of Cigarette Smoking With Short-Term High-Dosage Corticotrophin Therapy: Preliminary Communication.** *Journal of the Royal Society of Medicine* 78(8):649-650, August 1985.

The efficacy of short-term high-dosage corticotrophin therapy for alleviation of withdrawal symptoms and facilitation of smoking cessation was investigated in six men and four women who had smoking histories ranging from 5 to 200 pack years. After patients had been treated with an initial intramuscular injection of 180 IU corticotrophin gelatin, all but one stopped smoking. A second injection of 80 IU corticotrophin gelatin, given after 3 to 6 days to three patients who had withdrawal symptoms, enabled them to remain abstinent. The smoker who was unable to quit after the first injection reduced consumption from 80 to 30 cigarettes/day and quit smoking after the second injection. After 7 months, none of the patients had resumed smoking; 50 percent had weight gains ranging from 3.2 to 9.5 kg. No other side effects were reported. Results, which appear promising, should be regarded with caution, because the trial was uncontrolled and validity of results was not confirmed with biochemical testing.

86–1205. Drug Therapeutics Bulletin. **Nicorette—An Update.** *Drug Therapeutics Bulletin* 23(17):67-68, August 1985.

More people have used nicotine gum to stop smoking in antismoking clinics than in other settings (e.g., hospital outpatient clinics, general practice offices, and other trials), and differences in success rates are attributed to attitude of potential quitters. Individuals attending antismoking clinics are self-selected and well motivated. Nicotine chewing gum can be an important aid for individuals who want to quit smoking, but simple advice from a general practitioner should be offered first. If this fails, nicotine gum may help if its purpose and correct use are explained carefully. Unwanted effects, e.g. irritation of the mouth or throat, nausea, flatulence, hiccups, and aggravation of dyspepsia, are usually transient and seldom warrant discontinuing use. Severity of symptoms can be reduced by following manufacturer's instructions and avoiding too vigorous chewing. It is recommended that the 2 mg gum be tried first. Long-term dependence (over 1 year) has been noted in 5 to 10 percent of users.

86–1206. Hjalmarson, A.I.M. **Effects of Nicotine Chewing Gum on Smoking Cessation in Routine Clinical Use.** *British Journal of Addiction* 80(3):321-324, 1985.

Routine clinical use of nicotine chewing gum as a complement to group therapy treatment improved long-term abstinence among 2,404 smokers (47 percent men, 53 percent women) treated during three periods of therapy (1975 to 1980). In periods 1 and 3, nicotine gum was available in addition to group therapy. In period 2, the gum was not available. In Period 1, 25.5 percent of individuals treated remained abstinent at 12-month followup. The number decreased significantly, to 18 percent, in period 2 when gum was unavailable, but recovered to 25.1 percent in period 3 after gum was again added to the treatment program. When groups were divided into light smokers (5 to 14 cigarettes/day) and heavy smokers (>14 cigarettes/day), only heavy smokers had a significantly improved success rate with use of nicotine gum: period 1, 28 percent; period 2, 16 percent; period 3, 23 percent. The participants ranged in age from 18 to 75, with majority in the 30 to 60 age group. Men constituted 47 percent of the subjects. (Auth. Abs. Mod.)

86–1207. Jarvis, M.J. **The Use of Nicotine Chewing Gum in a Smokers' Clinic.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on*

Smoking and Health, Winnipeg, Canada, 1983, Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 377-382.

Nicotine chewing gum as a therapeutic aid for smoking cessation appears to be particularly well suited for a smoking clinic environment where heavy, pharmacologically dependent smokers predominate and instructions, expectations, and encouragement can be controlled. Among 58 smokers treated with nicotine gum and 58 treated with placebo, the advantage was apparent after 2 weeks; 67 percent of gum users had quit smoking compared with 45 percent of the placebo group. At 1 month, corresponding figures were 60 and 29 percent, respectively. The twofold advantage of active gum use was maintained throughout the year. At 1-year followup, 31 percent of nicotine gum users had not smoked since beginning treatment compared with only 14 percent of the placebo group. Forty percent were using active gum at 3 months compared with 14 percent of placebo gum users. Four gum users were dependent on nicotine gum throughout the year. Withdrawal symptoms (rated by participants) were significantly less severe with nicotine gum use. It is concluded that partial nicotine replacement together with intensive support and encouragement provided in a clinic setting, significantly enhances the ability of motivated smokers to give up smoking.

86–1208. Lambe, R.; Osier, C.; Franks, P. **A Randomized Controlled Trial of Hypnotherapy for Smoking Cessation.** *Journal of Family Practice* 22(1):61-65, January 1986.

The randomized control trial of hypnotherapy for smoking cessation described included (1) investigation of relationships between individual characteristics, such as smoking histories and demographic data, and success of hypnosis; (2) followup supportive contact; (3) standardized followup for a significant interval; and (4) use of individualized hypnotic suggestions. Of the 90 patients who were recruited into the hypnosis group, 45 underwent at least one 40-minute hypnotherapy session, 6 quit before hypnosis, 18 declined hypnosis, and 21 were lost to followup. At 3-month followup, 21 percent of hypnotherapy patients had quit smoking compared with 6 percent of controls ($p=<0.05$). At 6- and 12-month followup, 18 vs. 19 percent and 22 vs. 22 percent, respectively, reported that they had quit smoking (statistically nonsignificant). Results were not significantly changed when only those who actually underwent hypnosis were compared with the controls. Stepwise regression analysis revealed that the only consistent predictor of success for reduction of smoking was having a college education ($p=0.0001$ at 12-month followup).

86–1209. Michel, D. **Entzugsbehandlung. Nikotin Gegen Nikotin. [Treatment of Withdrawal. Nicotine Against Nicotine.]** *Fortschritte der Medizin* 103(37):7-8, October 3, 1985, German.

Although nicotine chewing gum contains 2 mg nicotine and a bicarbonate buffer for improved absorption, the majority of absorbed nicotine is metabolized in the liver and not released into circulation. Serum nicotine levels after chewing gum are less than 50 percent of those achieved after smoking. Success rates of between 5 and 20 percent have been observed for smoking cessation programs that combine use of nicotine gum and psychotherapy (50 to 100 percent higher than rates for placebo or other methods). Average consumption level is 15 pieces/day and most relapses occur during the first 3 months. Nicotine gum is contraindicated in patients with myocardial infarction, malignant arrhythmia, severe angina pectoris, or diseases of the temporomandibular joint. Side effects include palpitation, belching, nausea, and mucosal ulcers. It is emphasized that conversation with the patient and advice are important adjuncts for smoking cessation therapy. Several questions are raised including (1) whether the small benefit achieved in terms of cessation rates is worth the cost of treatment, especially for psychotherapy; (2) whether insurance companies should pay for treatments; and (3) what the indications for treatment are (e.g., willingness to quit smoking, degree of smoking dependence, or diseases due to smoking) Withdrawal symptoms following discontinuation of nicotine gum use have yet to be investigated.

86–1210. Raw, M.; Friend, J. **The Role of Chest Physicians as Smoking Cessation Counsellors.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 427-431.

Men with heart disease were more successful in quitting smoking in a British Thoracic Society study comparing smoking withdrawal in hospital patients with tobacco-related diseases. Of the 1,550 patients who were referred by primary care physicians for treatment over a 15-month period, 63 percent were men (average age 49 years, average consumption 24 cigarettes/day). Most (81 percent) had respiratory diseases, i.e., chronic bronchitis and asthma. The others had ischemic heart disease (9 percent) and other smoking-related diseases (10 percent). Randomly grouped patients received (1) verbal advice to stop smoking; (2) verbal advice plus a booklet on how to stop; (3) verbal advice plus the booklet and placebo chewing gum; or (4) verbal advice plus the booklet and nicotine chewing gum. Group 3 ($n=402$) had an 11.4 percent cessation rate compared with 9.8 percent in group 4 ($n=400$), 8.9 percent in group 1 ($n=371$), and 8.5 percent in group 2 ($n=377$). Mean weight gain was 6 kg in both men and women who stopped smoking successfully. Three factors were strongly associated with outcome: more men than women were able to quit (12.2 compared with 5.3 percent), patients with heart disease were more likely to succeed than those with other diseases, and success rates increased with age. Men with heart disease were the most successful group (20.7 percent).

86–1211. Russell, M.A.H.; Merriman, R.; Edwards, A.R. **Minimal Anti-Smoking Intervention by Physicians and Its Enhancement by Nicotine Chewing Gum.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the*

Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 439-443.

Nicotine gum significantly enhanced success of minimal intervention by physicians in a smoking cessation study, and it is estimated that the technique could yield 1 million ex-smokers annually if it were applied by the 28,000 family practitioners in Britain. Rationale behind the strategy is that less time spent with more smokers may be more productive than intensive effort with a few. Results of 1-year followup of 1,938 smokers aged 16 years and older revealed that the group receiving nicotine gum and followed up at 4 months and 1 year had a success rate double that of groups not using nicotine gum. Group 1 (n=584) were nonintervention controls; group 2 (n=675) received advice to stop smoking plus a booklet and a warning of followup; and group 3 (n=679) received the same treatment as group 2 but were offered nicotine chewing gum. The offer and availability of the gum (1) motivated more smokers to try to give up smoking ($p<0.001$); (2) increased the success rate among those who tried ($p<0.05$); and (3) reduced the relapse rate among those who had stopped at 4 months ($p<0.05$). Heavier smokers used more gum, and heavy gum use was associated with a higher success rate.

86–1212. Schlegel, R.P.; Shannon, M.E. **Butt Out! Evaluation of the Canadian Armed Forces Smoking Cessation Program.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 445-452.

Among participants of "Butt Out," the Canadian Armed Forces smoking cessation program developed specifically for the workplace, 40 percent were abstinent 1 year after the targeted quit day. Success was attributed to the problem-solving strategy that provided experience in certain high risk situations, and maintenance was strongly correlated with attitudes and certain recommended behaviors. Practice in relaxation developed coping strategies for stress, but it was noted that unsuccessful clients resorted to walks, swimming, and gardening activities too late in the relapse process. Of 243 program recruits from 28 bases and stations, 58 percent were not officers, 19 percent were officers, and the rest were civilian employees and dependents. Clients had smoked an average of 19.7 years (average self-reported consumption was 28.6 cigarettes/day). The program is based on an integrative model that cross-references seven phases of smoking cessation (motivation, preparation, rehearsal, initiation, transition, coping, and self-concept) with self-regulation (monitoring, evaluating, and reinforcing). Strategies are applied according to behavioral changes the smoker is experiencing. The object of self-monitoring and criteria for self-evaluation and self-reinforcement vary with each phase. Impetus and control of the process and outcome rests with the individuals, who tailor general principles and techniques of behavior change to particular circumstances of their smoking habit.

86–1213. Schneider, N.G.; Jarvik, M.E. **Nicotine Gum in Smoking Cessation: Outcome and Withdrawal in a Placebo-Controlled Trial.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 453-459.

Nicotine gum as an aid in cessation, the role of nicotine in withdrawal symptoms, and selection of candidates for nicotine gum were studied in two clinic-supported and minimum intervention (dispensary) placebo-controlled investigations. Nicotine gum alleviated withdrawal symptoms in users, while symptoms increased among placebo gum users, particularly in the evening. During the 5-day test, pulse rate also decreased significantly in the placebo group compared with the nicotine group. Symptoms of irritability, annoyance, hostility, and fluctuations in mood were significantly eased or prevented by nicotine gum, but the gum had borderline results in relief of frustration and depression. Feelings of hunger, urge to smoke, and missing a cigarette were reduced with active gum use ($p<0.05$). Clinic groups did much better than dispensary groups and had superior success rates over placebo groups. At 6 months, 48 percent of the nicotine group were abstinent compared with 20 percent of the placebo group. At 1 year, 30 percent of the nicotine group were still abstinent; percentage of abstainers in the placebo group stayed the same. High-nicotine-dependent smokers did better with active gum; low-nicotine-dependent smokers did better with the placebo gum. Nicotine gum was found to be a useful experimental and clinical tool for alleviating withdrawal symptoms and aiding the cessation process.

86–1214. Schwartz, J.L. **Developments in Smoking Cessation: Trends and Observations.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 461-471.

Two highly publicized events having a significant impact on smoking trends and indicating that large segments of the population have become supportive of nonsmoking were (1) showing of the antismoking documentary "Death in the West," depicting American cowboys dying of tobacco-related diseases juxtaposed with footage of television's Marlboro Man; and (2) passage of legislation in San Francisco aimed at controlling smoking in the workplace. Ninety-five percent of smokers who have quit have done so on their own. Smoking cessation studies show that smokers prefer ways of quitting that allow them to participate in cessation attempts. Smokers are more successful in quitting after learning they are at high risk: the quit rate among patients with pulmonary disease varied from 20 to 51 percent, and with heart disease from 22 to 62 percent. Psychologists are in the forefront of testing cessation methods (e.g., rapid smoking, covert sensitization, participant modeling, self-monitoring, self-control, role playing, and contingency contracting). Cessation methods using hypnosis, acupuncture, and nicotine chewing gum have shown good results, but evaluations are faulty, and no smoking cessation method appears superior. More studies are paying attention to relapse, and techniques that include strong maintenance work well. Cessation techniques that combine several methods achieve higher rates of success. Cessation methods that do not work are also discussed.

86–1215. West, R.J. **Corticotrophin Injections to Treat Cigarette Withdrawal Symptoms. (Letter).** *Journal of the Royal Society of Medicine* 78(12):1065, December 1985.

Use of corticotrophin to treat withdrawal symptoms and to aid smoking cessation, reported earlier (*Journal of the Royal Society of Medicine* 78(8):649-650, August 1985), seems plausible; however, the literature review left a misleading impression. Specifically, (1) contrary to assertions, there is clear evidence from double-blind placebo-controlled trials that nicotine gum reduces cigarette withdrawal symptoms and improves the chances of long-term abstinence; (2) evidence that smoking causes a rise in blood sugar is weak and most studies have failed to find such an effect; (4) even if smoking causes a rise in blood sugar there is no evidence as yet to link it with a rise in cortisol output; (4) contrary to assumptions, there is a marked decrease in adrenaline output on smoking withdrawal and not an increase; and (5) there is no evidence that smokers are hypoglycemic during withdrawal. However, treatment with corticotropin may reduce withdrawal symptoms, by acting either on the cause of the symptoms or in some other way, and may prove useful in smoking cessation, but at present it must be considered alongside placebos. See also 86-1204.

86–1216. Wilson, E.E. **Smoking: When It's Time to Quit.** *Canadian Journal of Public Health* 76(4):274-275, July-August 1985.

Two methods (intensive group-oriented vs. mass media method) of delivering Time to Quit (TTQ), a Canadian smoking cessation program targeting 25- to 44-year-olds who have a moderate desire to quit smoking, were compared in three health care institutions. Indices for change in smoking behavior were (1) switching to a milder brand of cigarette; (2) making an effort to quit within the last year; (3) smoking fewer cigarettes than 1 year ago; and (4) quitting within the last year and not currently smoking. Approximately 35 percent of the nurses, pharmacists, and other hospital employees were current smokers and 79 percent had smoked >5 years. Of 26 program participants at one hospital, 23 had smoked >5 years and 24 had smoked >10 cigarettes/day. Results showed no difference in the number who switched brands or who had quit in the last year; however, a greater number had made an effort to quit ($p=0.02$), and a greater percentage were smoking less than 1 year earlier ($p=0.08$). Smoking reduction was proportional to attempts to quit in all three institutions, suggesting that program strategy for smoking cessation is less important than motivation. In this respect, the intensive presentation of TTQ was more effective than the mass media method.

PASSIVE SMOKING

86–1217. Berkey, C.S.; Ware, J.H.; Dockery, D.W., et al. **Indoor Air Pollution and Pulmonary Function Growth in Preadolescent Children.** *American Journal of Epidemiology* 123(2):250-260, February 1986.

The relationship between exposure to sidestream smoke or gas stove emissions and pulmonary function and growth rate was investigated in 7,834 children examined two to five times between the ages of 6 and 10 years. At 8 years of age, forced expiratory volume in 1 sec (FEV_1) in children whose mothers smoked one pack of cigarettes/day was 0.81 percent lower than in children of nonsmokers ($p<0.0001$), and growth rates for FEV_1 were approximately 0.17 percent/year lower ($p=0.05$). Forced vital capacity (FVC) at 8 years of age in children whose mothers smoked one pack/day were 0.37 percent higher than in children of nonsmokers ($p=0.12$); however, FVC growth rates were 0.17 percent/year lower ($p=0.04$). The magnitude of the effect on FEV_1 is consistent with deficits in FEV_1 of up to 3 percent in early adult life due to childhood exposure to sidestream cigarette smoke. Because few mothers changed their smoking habits during the study, it was not possible to determine whether the difference in rate of growth was due to current exposure or to an effect of prenatal and early childhood exposure. Further followup as the children are exposed to other risk factors (such as active smoking) should aid in evaluation of findings. (Auth. Abs. Mod.)

86–1218. Burch, P.R.J. **Passive Smoking in Adulthood and Cancer Risk. (Letter).** *American Journal of Epidemiology* 123(2):368-369, February 1986.

It is suggested that a previously reported study (*American Journal of Epidemiology* 121(1):37-48, January 1985) to investigate cancer risk in relation to passive smoke exposure actually studied incidence of cancer in active and nonactive smokers in relation to the smoking habits of the spouse. Reports have shown that typical workplace smoke exposure levels are much higher than in the home; therefore, smoking habits of the spouse are considered a poor surrogate for passive cigarette smoke exposure. The statistically significant associations found between passive smoking and several specific tumor sites not ordinarily regarded as smoking-related suggests presence of uncorrected confounding factors. Observed cancer associations were correlated with the status of the spouse and not with exposure to cigarette smoke. The phenomenon of assortative mating, defined as underlying factors leading to the choice of a smoking or nonsmoking spouse, may be associated with the increased risk observed for some cancer sites. Although the study did not report passive smoking associations, it did shed some interesting light on cancer associations with the smoking/nonsmoking status of the spouse. See also 85-0735.

86–1219. Fairbanks, L.L. **Sidestream Smoke: A Mainstream Health Problem—The Arizona Response.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 519-521.

Arizona was the first State to pass legislation curtailing smoking in public places (1973) for reasons of health. Tobacco smoking was declared a public nuisance and dangerous to health in elevators, indoor theaters, libraries, art museums, lecture or concert halls, public buses, school buildings, waiting rooms, rest rooms, lobbies or hallways of any health care facility, public waiting rooms of health-associated laboratories and facilities, and waiting rooms of physicians, dentists, psychologists, physiotherapists, podiatrists, chiropractors, naturopaths, optometrists, or opticians. Special smoking areas were made available. Approximately two-thirds of Arizona adults are nonsmokers and support the clean indoor air concept. Noncompliance under the law is controlled by positive peer pressure without resorting to police actions to arrest violators. Smoking policies are being adopted voluntarily by restaurants and sports organizations. The University of Arizona has instituted a smoking policy that requires smokers to accede to preferences of nonsmokers. A 100 percent smoke-free environment exists in all Arizona hospitals.

86–1220. Fergusson, D.M.; Horwood, L.J. **Parental Smoking and Respiratory Illness During Early Childhood: A Six-Year Longitudinal Study.** *Pediatric Pulmonology* 1(2):99-106, March-April 1985.

Children born in New Zealand in mid-1977 were examined to determine (1) the relationship between rates of lower respiratory tract infection or symptoms, parental smoking habits, and children's ages and to devise a statistical model describing linkages between variables; and (2) the association between parental smoking and onset of asthma and frequency of asthmatic attacks during early childhood. Maternal but not paternal smoking was associated with a significant increase in rates of lower respiratory tract infections and lower respiratory tract symptoms during the first 2 years of a child's life. The association persisted when perinatal, social, and familial factors were taken into account. After the age of 2 years there was no detectable association between parental smoking habits and lower respiratory infections. Evidence did not indicate that children of smokers had increased risks of asthma or rates of asthmatic attacks during early childhood.

86–1221. Friedman, G.D. **Passive Smoking in Adulthood and Cancer Risk. (Letter).** *American Journal of Epidemiology* 123(2):367, February 1986.

It is suggested that other confounding factors might account for the increased risks of cancer observed among spouses of active smokers reported earlier (*American Journal of Epidemiology* 121(1):37-48, January 1985), which were attributed to passive smoking. Increased alcohol intake, exposure to occupational hazards, and husbands' sexual behavior may account for observed increases in incidence of breast, hematopoietic, and cervical cancers, respectively. Although it was pointed out that sidestream smoke has higher concentrations of certain carcinogens than mainstream smoke, it would be surprising if passive smoking actually caused any cancers that were not associated with active smoking because (1) the dosage of smoke is much lower in passive than in active smoking, and (2) smokers also "passively" breathe sidestream smoke in addition to inhaling mainstream smoke. See also 85-0735.

86–1222. Glantz, S.A. **The Tobacco Industry's Response to Scientific Evidence on Involuntary Smoking.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 287-292.

More than two-thirds of nonsmokers and nearly half of smokers believe that smoking is hazardous to a nonsmoker's health, according to a Roper survey sponsored by the tobacco industry. However, a U.S. Department of Health, Education, and Welfare survey conducted in 1975 found that relatively few nonsmokers are aware that 70 percent of them agree that smoking should be allowed in fewer places than it is now. Another survey (Chilton Research Services) found that only 17 percent of adults knew that the percentage was this high. Tobacco industry strategy dealing with growing public awareness and interest in the health effects of involuntary smoking has been to attack the available evidence and to create a controversy about the validity of scientific studies linking involuntary smoking with harm to nonsmokers. Evidence of just such a plan by Brown and Williamson, obtained under subpoena by the Federal Trade Commission, is presented, and its strategy against a 1981 study linking involuntary smoking with cancer is outlined. The tobacco industry's advertising campaign urging the public "to weigh both sides" is illustrated, and examples of out-of-context quotations and other representations are documented.

86–1223. Johnson, L.C.; Letzel, H.; Kleinschmidt, J. **Passive Smoking Under Controlled Conditions.** *International Archives of Occupational and Environmental Health* 56(2):99-110, 1985.

Cotinine levels in 24-hour urine analyzed by radioimmunoassay (RIA) appears to be the most sensitive and reliable measure of passive smoke exposure and for validating questionnaires or interviews about short-term exposure to passive smoking. Ten healthy persons exposed to passive smoke at a level corresponding to 25 to 30 ppm carbon monoxide in ambient air for 3 hours showed interindividual variability of subsequent nicotine and cotinine levels in saliva, plasma, and 24-hour urine. The kinetic pattern found in saliva levels for up to 24 hours was consistent with previous data found in active smokers. Saliva nicotine levels were markedly influenced by repeated sampling, whereas cotinine was not. Low but measurable levels were observed for nicotine and cotinine in a majority of subjects at baseline. After exposure, high nicotine levels (median 89.7 ng/mL; range 24.7 to 186.5 ng/mL) were measured, followed by a quick drop over the next 3 hours to almost baseline levels. Cotinine, showing a less marked increase, reached maximum levels 3 hours after end of exposure (median 19.5 ng/mL; range 14 to 29 ng/mL), followed by a slow decline. Despite substantial variability, the overall trend for nicotine was consistent with a short half-life (30 to 110 minutes); cotinine values were consistent with a substantially longer half-life (19 to 40 hours). As a laboratory technique, RIA appeared to be more sensitive than gas chromatography. (Auth. Abs. Mod.)

86–1224. Jones, J.C. **Lufta er for Alle! Retten til a Puste i Roykfri Luft. Rapport med Lovforslag fra Statens Tobakkskaderad. [Air Is for Everybody! The Right to Breathe Smoke-Free Air. Report With a Suggestion for a National Law Necessary Because of Damage Due to Tobacco.]** July 24, 1985, 132 pp., Norwegian.

Concern for the health effects of passive smoking prompted a review of current health, sociological, and legal issues in Norway. Major areas of interest summarized include (1) medical/sanitary relationship of passive smoking; (2) sociological perspective of the question of passive smoking; (3) legal and actual situation in Norway today; (4) circumstances in other countries; (5) suggestions for handling the situation in the future; and (6) suggestions for new regulations concerning tobacco-related laws. Specific health-related issues discussed include (1) review of harmful tobacco smoke constituents; (2) immediate and long-term effects of exposure to smoke-polluted air; (3) effects resulting from smoke exposure in a room; and (4) specific effects in children, people with chronic lung diseases and allergies, and patients with angina pectoris. Passive smoking issues in Denmark, Finland, Iceland, Sweden, the United States, and Israel are also reviewed.

86–1225. Koop, C.E. **Call for a Smoke-Free Society.** *Pediatric Pulmonology* 1(1):4-5, January-February 1985.

Bronchitis, pneumonia, and other lower respiratory tract diseases (and hospitalization for these conditions) are more common among young children of smokers than among children of nonsmokers. A dose—response relationship has been observed between parental smoking and reports of chronic cough, chronic phlegm production, and persistent wheezing in children. When both parents were smokers, the increase in symptoms was greater than that observed when only one parent smoked. Even more important is the influence of parental behavior on children. Cigarette smoking in our culture to a very great extent is passed along by parents to children: 75 percent of adolescent smokers come from families where one or both parents smoke. To discourage parents from smoking, physicians can (1) inform parents about the risks associated with cigarette smoke; (2) show how risks of illness and premature death are reduced with cessation of smoking; (3) encourage abstinence by advice and direct service; (4) refer patients to smoking cessation programs; and (5) provide specific cessation and maintenance strategies at their office. A smoke-free society by the year 2000 is attainable if governments, private agencies, professionals and laymen, and parents and teachers work together.

86–1226. Lefcoe, N.M. **Passive Smoking. Acute Effects in Asthma.** *Chest* 89(2):161, February 1986.

Lung function research has identified three interrelated effects of tobacco smoke that are germane to the ongoing debate on passive smoking: (1) chronic exposure to secondhand tobacco smoke in the workplace decreases forced expiratory flow at 25 to 75 percent (FEF_{25-75}) and similar exposure in the home reduces forced expiratory volume in 1 sec and FEF_{25-75}; (2) smoking produces certain acute effects, including highly significant increases in airways resistance, and passive smoking may produce a similar acute effect; and (3) smoking increases bronchial reactivity in persons with otherwise normal pulmonary function tests. Future research might investigate effects of mild exercise on asthmatic patients in an exposure chamber to mimic real-life situations more closely than chair-bound experiments. Delayed effects of a passive smoking insult could be followed up in asthmatic patients for 48 hours. Medical history abounds in examples of physicians dismissing symptoms because neither physical examination techniques nor routine laboratory tests could uncover supporting evidence. Other tests may prove more sensitive than those currently employed in studying the physiology of passive smoking. (Auth. Abs. Mod.)

86–1227. Mantel, N. **Passive Smoking in Adulthood and Cancer Risk. (Letter).** *American Journal of Epidemiology* 123(2):367-368, February 1986.

A report indicating that passive smoking raises the risk of cancer (*American Journal of Epidemiology* 121(1):37-48, January 1985) is questioned, specifically about how passive smoking could double the rate of cancer in general, including cancer of sites not previously associated with active smoking. It is suggested that the choice of confounding factors may have been the problem. Presumably, the factors adjusted for among nonsmokers were age, race, sex, and education; however, these are straightforward factors requiring adjustment that any reasonable epidemiologist would employ. True potential confounding factors in families with one smoker compared with families with no smokers might include differences with respect to alcohol consumption, dietary habits, sexual behavior, number of children or pregnancies, ages at first birth or pregnancy, and occupations. These possible correlates of smoking practice, which might account for the observed differences reported in cancers of a variety of sites, are the true confounding factors, whether or not we are in a position to assess them. See also 85-0735.

86–1228. Pelkonen, O. **Passive and Active Exposure to Cigarette Smoke in a Smoking Experiment.** *Journal of Toxicology and Environmental Health* 16(3/4):523-534, 1985.

Among the various parameters used to evaluate the methods of measuring passive exposure to cigarette smoke and the interrelationships between active and passive exposure of the same individuals, increasing trends in passive smokers were seen only in urinary mutagenic activity and in plasma cotinine values. Six volunteer female habitual smokers were exposed during a 2-week period to cigarette smoke, both actively and passively, in an exposure chamber where the ambient carbon monoxide, particle, and aldehyde concentrations were monitored. Three of the six smoked a total of 30 cigarettes during each of the 5-hour experimental days (two cigarettes/person/hour). Samples of blood and urine were taken after three nonsmoking days (before the experiment) and after each day of active or passive smoking. Blood carboxyhemoglobin, plasma cotinine, and urinary mutagenicity were higher in samples taken after active smoking than after nonsmoking. Although exposure conditions were similar for all participants, the parameters measured showed quite high interindividual variations. Thioethers and thiocyanates were not significantly elevated in samples from active smokers, and there were no differences in sister chromatid exchange frequencies. Further studies and development of methods are needed to evaluate the long-term low-dose exposure of passive smokers and to characterize the relevancy of the various intake markers to the absorption of carcinogenic compounds in tobacco smoke. (Auth. Abs. Mod.)

86–1229. Pryor, W.A.; Dooley, M.M.; Church, D.F. **Human α-1-Proteinase Inhibitor Is Inactivated by Exposure to Sidestream Cigarette Smoke.** *Toxicology Letters* 28(1):65-70, October 1985.

Direct exposure of human α_1-proteinase inhibitor (α_1-PI) to sidestream cigarette smoke caused an initial rapid loss of elastase inhibitory capacity followed by a slow gradual loss of activity as the protein was incubated in smoke-exposed aqueous buffer solution. An eventual loss of approximately 40 percent of elastase inhibitory capacity resulted from using one cigarette. This biphasic pattern of inactivation was similar to that seen following direct exposure of α_1-PI to mainstream smoke. Results suggest that α_1-PI may also be inactivated in vivo in people subjected to large amounts of sidestream smoke during long-term exposure. Although exposures to sidestream smoke by nonsmokers are generally lower than exposures to mainstream smoke experienced by smokers, sidestream smoke has the potential to produce similar types of damage, including emphysema-like damage, and should not be regarded as innocuous. (Auth. Abs. Mod.)

86–1230. Repace, J.L. **The Dosimetry of Passive Smoking.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 191-198.

More than 85 percent of nonsmokers of working age are exposed to passive smoke and average workplace exposures are about four times higher than the estimated average for domestic exposures in the United States. A single-compartment model for equilibrium dose of respirable aerosol to nonsmokers' lungs resulting from regular passive smoking indicates that tobacco tar may accumulate to levels reaching an order of magnitude higher than nominal daily exposures. This phenomenon offers a possible explanation for results of epidemiological studies of diseases caused by passive smoking that indicate risks are substantial fractions of those of active smoking. Estimates of average doses to nonsmokers from passive smoking at home and at work suggest that typical equilibrium doses from these two microenvironments are 20 mg and 5 mg, respectively, and overall probability-weighted dose to the typical nonsmoker appears to be about 16 mg. The worst-case equilibrium dose is estimated to be 160 mg of tobacco tar on the bronchial epithelium. Magnitude of doses is equivalent in value to exposure obtained in smoking from 0.33 to 11 sales-weighted average tar (14 mg) cigarettes/day (1981 value). Because nonsmoker doses of tobacco smoke from passive smoking appear to be well within the range of exposure of active smokers, there is good reason to believe that indoor air polluted with tobacco smoke poses a significant threat to the health of nonsmokers. (Auth. Abs. Mod.)

86–1231. Samet, J.M.; Speizer, F.E. **Passive Smoking and the Lungs: A Review of Effects Other Than Malignancy.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 199-205.

Evidence during the past 10 years meets conventional epidemiological criteria for a causal relationship between passive smoking and increased incidence of lower respiratory tract infection during pregnancy. Although associated with only modest elevations of relative risk, passive smoking could be an important source of morbidity in infancy. Assuming a 30 percent prevalence of maternal smoking and a relative risk of 2.0, 23 percent of lower respiratory tract infections during infancy are attributable to such exposure. For symptoms and lung function level, data on passive smoking effects are conflicting, but investigations least affected by limitations of sample size and insensitive lung function measurements suggest that lung function in children is impaired by passive smoking. Health effects of passive smoking on adults, though equally controversial, indicate a reduction of forced expiratory flow from 25 to 75 percent of forced vital capacity in two cross-sectional investigations, including a study of 7,800 adults over 40 years of age who were spouses of smokers. While clarification of passive smoking effects is an important scientific objective, sufficient data for development of preventive strategies are already available.

86–1232. Samfield, M. **Importance of Cigarette Sidestream Smoke—Further Aspects.** *Tabak Journal International* 6:448, December 1985.

Growing public protest about cigarette smoking in public places and the workplace has prompted some U.S. Federal agencies to investigate the contribution of cigarette smoke to air pollution. Many compounds considered to be detrimental to public health are found in cigarette sidestream smoke. The greater the air dilution in a cigarette, the more the cigarette approaches free burning, tending to increase the sidestream-to-mainstream ratios for most compounds. There is, however, lack of data on the composition of smoke and the amount of smoke exhaled by the smoker. Various methodologies used to determine passive smoke exposure in nonsmokers and to estimate the concentration of cigarette smoke in enclosed spaces are reviewed. Some possible answers to the passive smoking problem are outlined, including reduction in cigarette weight through use of expanded tobacco and use of certain materials incorporated into the cigarette paper or into the tobacco itself. Alleviation of the problem in homes includes use of electrostatic precipitators and adequate ventilation. In the past few years, the problem of passive smoking has been aggravated by construction of energy-efficient buildings. (Auth. Abs. Mod.)

86–1233. Sandler, D.P.; Everson, R.B.; Wilcox, A.J. **Passive Smoking in Adulthood and Cancer Risk. (Letter).** *American Journal of Epidemiology* 123(2):369-370, February 1986.

In response to criticisms (*American Journal of Epidemiology* 123(2):367-369, February 1986) of a report on the association between passive smoke exposure in the home and subsequent cancer risk (*American Journal of Epidemiology* 121(1):37-48, January 1985), it is agreed that it would have been useful to have information on a greater number of potential confounding factors. However, it is difficult to do justice to individual cancer sites when investigating many cancers, since risk factors vary widely by site. However, some of the confounding factors suggested are not likely to explain reported findings. Although smoking habits of the spouse may be a poor surrogate for passive smoke exposure, it was felt that these criteria distinguish the most exposed from the least exposed because individuals who live with smokers are more likely to be exposed to other people's cigarette smoke. This may be a result of greater tolerance of smoking or because of exposure to other smokers when in the company of their spouse. In view of evidence suggesting that passive smoking is not simply a lower dose of active smoking, observations of passive smoking-associated increased risks for cancers at sites not normally considered "smoking related" cannot be totally ruled out. See also 85-0735, 86-1218, 86-1221, 86-1227.

86–1234. Sandler, D.P.; Everson, R.B.; Wilcox, A.J. **Cigarette Smoking and Breast Cancer. (Letter).** *American Journal of Epidemiology* 123(2):370-371, February 1986.

Data on the risk of cancer associated with passive exposure to cigarette smoking by spouse (*American Journal of Epidemiology* 121(1):37-48, January 1985) are reanalyzed, stratifying on menopause status in response to a reported association between cigarette smoking and premenopausal but not postmenopausal breast cancer (*American Journal of Epidemiology* 121(4):479-487, April 1985). Despite a small number of cases, a statistically significant association was observed between smoking by spouse and premenopausal breast cancer (odds ratio (OR) 7.0), but not postmenopausal breast cancer (OR 1.2). Adjusting for various confounding factors did not change results. OR for premenopausal breast cancer increased after adjustment for active smoking (OR 9.0); OR for postmenopausal breast cancer remained unchanged. This association, which has not been observed in other studies, may be related to the younger age of cases and possibly a smaller likelihood of misclassification by smoke exposure status. Future studies should collect data that will allow for stratification into at least three smoking categories: (1) nonexposed, (2) passive exposure only, and (3) active smokers. See also 85-0735, 85-1041.

86–1235. Shephard, R.J. **Irritating and Annoying Effects of Cigarette Smoke.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 213-216.

Arguments to limit smoking in public places may ultimately be based on concerns such as respiratory disease in children, increased risk of bronchial carcinoma, and danger of fire, but the most readily justified complaints from nonsmokers are annoyance and irritation. The gas phase of smoke seems largely responsible for annoyance, while the particulate phase is to blame for irritation. In general, ex-smokers are annoyed to at least the same extent as nonsmokers. Exposure to cigarette smoke was estimated from accumulation of carbon monoxide in a room, accumulation of carbon monoxide in subject's blood, and urinary excretion of substances such as nicotine. Nonsmokers complained of eye irritation, suffusion, and lachrymation with associated disturbance of vision. More than 50 percent of nonsmokers and ex-smokers and 40 percent of continuing smokers complained of lachrymation. Nasal complaints included odor, nasal discharge, nasal obstruction, itching, dryness, and frequent rubbing of the nose. Symptoms were twice as frequent in children who disliked smoke, and women showed appreciable tachycardia during smoke exposure. Antismoking legislation is needed to assure clean air for nonsmokers because energy costs preclude engineering smoke out of a room.

86–1236. Tostain, J. **Communication de la "Ligue Contre la Fumee du Tabac en Public" (L.C.F.T.P.). [Report of the "League Against Smoking of Tobacco in Public" (L.A.S.T.P.).]** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 143-145, French.

In France, nonsmokers, refusing to be passive smokers or to be controlled by a minority (only 33 percent of the population are smokers), are banding together to fight for nonsmokers' rights. The goals of the League Against Smoking of Tobacco in Public are to (1) generate a national antismoking campaign; (2) motivate national authorities to enforce antismoking legislation; (3) encourage health professionals to act as exemplars of nonsmoking behavior; (4) protect workers from passive smoking in the workplace; (5) protect nonsmokers from passive smoking in public places; (6) provide health information on the hazards of passive smoking; and (7) educate legislators and executives on the importance of keeping air clean for nonsmokers to breathe. The league claims that (1) from 15 to 20 percent of nonsmokers are susceptible to illness from the smoke of others, (2) from 20,000 to 30,000 workers die each year as a result of passive smoking, and (3) smokers either do not realize the consequences of their behavior or do not care. The league is fighting for change on a national level, primarily away from prevention and toward reparation of damage inflicted by smokers.

86–1237. Wiedemann, H.P.; Mahler, D.A.; Loke, J., et al. **Acute Effects of Passive Smoking on Lung Function and Airway Reactivity in Asthmatic Subjects.** *Chest* 89(2):180-185, February 1986.

Passive smoking presented no acute respiratory risk in nine asymptomatic asthmatic patients (aged 19 to 30 years) and no change in expiratory flow rates; however, a small decrease in nonspecific bronchial reactivity, as assessed by methacholine inhalation challenge testing was detected ($p=0.022$). Pharmacologically active substances present in cigarette smoke, such as nicotine, may explain the observed change in airway reactivity. Decreased airway reactivity suggests that passive smoking may produce a protective effect on underlying asthma; however, the observed change in reactivity was slight and of uncertain clinical significance. Involuntary smoking produced unpleasant symptoms (eye and nasopharyngeal irritation), which may be a sufficient reason to regulate smoking in confined public places. The effects of passive smoking, particularly association with important pulmonary physiologic hazards, remain controversial. (Auth. Abs. Mod.)

See also, **86–1021**

SMOKELESS TOBACCO

86–1238. Aghi, M.B. **Tobacco and the Indian Woman.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 255-257.

In India, only 2 to 5 percent of urban women smoke cigarettes, and most of these work for multinational companies (i.e., airlines and television and film industries). However, use of other types of tobacco in rural India is quite different: women chew pan (betel leaf) with tobacco and lime in Kerala; smoke bidis (small cigars) and hookah in Bihar and parts of Punjab and Haryana; smoke dhumti in Goa; rub and plug burnt powdered tobacco inside the cheek or under the lip in Maharashtra, Gujrat, and Bihar; and smoke chutta (similar to a cigar or cheroot) with the lighted end in the mouth in Andhra. Tobacco use among rural women is equal to that of men, and oral cancer, the most frequent cancer found in India, is positively associated with the tobacco habit. Data on tobacco-related mortality over a 10-year period show a crude relative risk of 3.4 for women compared with 2 to 3 for men. Intervention strategies include personal interaction, films, folk drama, radio slogans and playlets, newspaper articles, posters, and slide projections. Personal interaction has produced the greatest impact among females, a strategy most amenable to the manner of urban Indian women, who are more open in a one-on-one situation and have less ego problems than men.

86–1239. International Agency for Research on Cancer. **Tobacco Habits Other Than Smoking; Betel-Quid and Areca-Nut Chewing; and Some Related Nitrosamines.** *IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans,* Volume 37. Lyon, France, World Health Organization, IARC, September 1985, 297 pp.

This comprehensive review of the carcinogenic risks of tobacco use other than smoking, betel quid, and areca nut and some related nitrosamines found that smokeless tobacco is used by millions of people, principally in Africa, Asia, Europe, and North America, utilizing several techniques, products, and dosage levels. Among the thousands of compounds present in tobacco, the tobacco-specific nitrosamines are the only identified carcinogens that occur in mg/kg concentrations, and use of smokeless tobacco entails extensive exposure to relatively high levels of tobacco-specific nitrosamines. Data from studies of chewing tobacco and snuff showed that there is sufficient evidence that oral use of snuffs of the types commonly used in North America and western Europe is carcinogenic to humans, and limited evidence that chewing tobacco of the types commonly used in these areas is also carcinogenic. However, there is inadequate evidence that oral use of other smokeless tobacco preparations (nass, naswar, mishri, gudakhu, shammah) or nasal use of snuff is carcinogenic to humans. Data was inadequate to evaluate carcinogenicity in experimental animals. The habit of chewing betel quid is widespread in southeast Asia and in the South Pacific islands and in people of Indian origin elsewhere in the world. Betel quid usually contains areca nut, lime, and catechu wrapped in a betel leaf. When tobacco is added, chewers are exposed to areca nut alkaloids, N-nitroso compounds derived from these alkaloids, polyphenols, and tobacco-specific nitrosamines. Many studies have identified an association between chewing betel quid with tobacco and oral cancer, an association that has been consistent across many countries, and it was concluded that there is sufficient evidence that betel quid containing tobacco is carcinogenic to humans. Results on related nitrosamines found that (1) there is sufficient evidence for the carcinogenicity of 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone, N′-nitrosonornicotine, and 3-methylnitrosaminopropionitrile in experimental animals (no data on humans were available); (2) data were limited as to the carcinogenicity of N′-nitrosoanabasine in experimental animals; and (3) available data were inadequate to evaluate the carcinogenicity of 4-(methylnitrosamino)-4-(3-pyridyl)butanol and N′-nitrosoanatabine in experimental animals (no data on humans were available).

86–1240. Jungell, P.; Malmstrom, M. **Snuff-Induced Lesions in Finnish Recruits.** *Scandinavian Journal of Dental Research* 93(5):442-447, October 1985.

Snuff-induced lesions in 21 users were examined clinically, histologically, and by electron microscopy after a tobacco use survey of 441 recruits aged 17 to 29 assigned to a Finnish military unit. Among 48 (11 percent) who reported using snuff, alteration of the mucosa was seen in 21, 12 showed no alteration, and 7 were either indisposed or would not submit to a biopsy. The eight who had recently given up snuff use after dipping for many years showed clinically healthy mucosa, supporting earlier findings that snuff-induced lesions are reversible, especially in the early stages. Snuff use ranged from 2 weeks to 12 years (mean 4.2). Age of onset was from 8 to 20 years (mean 14.4) and frequency was from 1 to 20/day (mean exposure, 45 minutes in maxillary labial sulcus). Clinically, most lesions appeared coarsely wrinkled, grayish white, and slightly elevated. All lesions were found in the upper vestibular area. Histologically, epithelial thickening, acanthosis, vacuolation of surface cells, and a slight subepithelial inflammatory reaction were seen. Electron microscope findings revealed an intact basement lamina, increased tonofilament concentration moving up toward the surface of the epithelium, widening of intercellular spaces in the spinous cell layer, and partial keratinization of surface cells. The salivary flow of resting saliva showed a slightly significant increase in users compared with controls. Stimulated saliva was not significantly increased among snuff users. (Auth. Abs. Mod.)

86–1241. Landrigan, P.J.; Gehlbach, S.H.; Graef, J.W., et al. **Smokeless Tobacco—A Carcinogenic Hazard to Children.** *Pediatrics* 76(6):1009-1011, December 1985.

Smokeless tobacco, a proven carcinogen, is a serious health hazard to children, adolescents, and young adults. The American Academy of Pediatrics recommends that (1) pediatricians urge cities and States to label smokeless tobacco products with strong health warnings and to ban smokeless tobacco advertising and free giveaways; (2) the Federal Trade Commission (FTC) and Congress regulate and legislate warning labels on smokeless tobacco products and ban smokeless tobacco advertising; (3) the FTC sponsor counter-advertisements, particularly on television, to inform the public of the dangers of smokeless tobacco; (4) Congress empower the Food and Drug Administration to set limits for nitrosamines in smokeless tobacco products, similar to FDA limits for beverages and medical products; (5) Congress reinstate the Federal excise tax (repealed in 1965) on smokeless tobacco, making it sufficiently high to deter purchases by children; and (5) the players' associations of major professional sports discourage members from appearing in smokeless tobacco advertising. (Auth. Abs. Mod.)

86–1242. Schroeder, K.L.; Chen, M.S.; Kuthy, R.A. **Smokeless Tobacco: The New Thing to Chew On.** *Ohio Dental Journal* 59(7/8):11-14, July-August 1985.

The resurgence of smokeless tobacco use, particularly as a popular social habit among adolescents, has aroused renewed interest into possible adverse health effects. Reported oral health sequelae of smokeless tobacco use include halitosis, discoloration of teeth and fillings, destruction of periodontal bone and soft tissues, slower healing of cuts and sores in the mouth, dental caries, tooth abrasion and accompanying gum recession, and oral leukoplakia. Additionally, smokeless tobacco use has been implicated in cancer of the gum, mouth, pharynx, larynx, and esophagus and has a specific association with verrucous carcinoma. Many health effects are attributed to nicotine, either directly (as in vasoconstriction and cardiovascular or neuromuscular disease) or indirectly through conversion into carcinogenic metabolites. It has been demonstrated that nicotine, nornicotine, and anatabine found in tobacco give rise to tobacco-specific N-nitrosamines implicated as organic carcinogens. Dentists are usually among the first to detect suspicious oral lesions and possible compromization of general health attributable to smokeless tobacco use. Immediate patient education upon detection of such lesions might help prevent further sequelae from occurring.

86–1243. U.S. House of Representatives, 99th Congress, 1st Session. **Health Effects of Smokeless Tobacco—H.R. 760, H.R. 2950, and H.R. 3078.** In: *Hearings Before the Subcommit-*

tee on Health and the Environment of the Committee on Energy and Commerce, U.S. House of Representatives, 99th Congress, July 26, 1985, Serial No. 99-41, 1985, pp. 61-610.

Proceedings of the Subcommittee on Health and the Environment of the U.S. House of Representatives concerning the health effects of smokeless tobacco are presented. Testimony and materials submitted for the record in response to three proposed bills are included. The "Health in Advertising Act" (H.R. 760) proposes that the Federal Cigarette Labelling and Advertising Act be amended to prohibit advertising of any tobacco product on any medium of electronic communication. The "Comprehensive Smokeless Tobacco Education Act" (H.R. 2950) would require one of the following warnings on all smokeless tobacco products and in advertisements: "This Product May Cause Mouth Cancer," "This Product May Cause Gum Disease and Tooth Loss," or "This Product Contains Nicotine and Is Addictive." Warnings would be rotated periodically and each would appear on any one brand an equal number of times in a 12-month period. The "Smokeless Tobacco Control Act of 1985" (H.R. 3078), would (1) establish a Federal initiative regarding the dangers of smokeless tobacco; (2) provide assistance to States for programs respecting such dangers; and (3) amend the Internal Revenue Code of 1954 to disallow deductions for smokeless tobacco advertising expenses, impose an excise tax of 32 cents/ounce on smokeless tobacco, and establish a trust fund for cancer research and smokeless tobacco educational activities.

86–1244. U.S. Department of Health and Human Services. **Youth Use of Smokeless Tobacco: More Than a Pinch of Trouble. National Program Inspection.** U.S. Department of Health and Human Services, Office of Inspector General, Office of Analysis and Inspections, Control No. P-06-86-0058, January 1986, 54 pp.

Adolescent use of snuff and chewing tobacco has risen rapidly in recent years and is increasing. Users are predominantely white males, and average age of first use is 10 years (fifth grade) and 12 years for regular or daily use. Survey results show that (1) advertising is influential in getting adolescents to try smokeless tobacco; (2) most adolescents are unaware of the health risks of dipping and chewing (6 of 10 junior high school users and 4 of 10 senior high school users reported no risk or only a slight risk from regular smokeless use); (3) most users (81 percent) consider smokeless tobacco safer than cigarettes; (4) 5 of 10 users believe gum and mouth problems among dippers are rare; and (5) 25 percent think snuff does not contain nicotine. Among junior high students, one-fourth do not consider regular use addictive, and one-third do not associate use with mouth cancer. From self-reports, 4 of 10 users have had site-specific leukoplakia; 37 percent have experienced sores, blisters, and ulcers on their gums, lips, and tongue; and 20 percent have receding gums. It is recommended that the Surgeon General (1) launch an educational public media campaign on the risks of smokeless tobacco use; (2) support school health education efforts; (3) seek funding for basic research on smokeless tobacco use and risks; and (4) provide strong national leadership on the smokeless tobacco issue.

See also, **86–1058, 86–1268**

TOBACCO PRODUCT ADDITIVES

86–1245. Schenk, H. **Flavorants Containing Esters of 2,3,6,6-Tetramethylcyclohexenyl Carboxylic Acids.** United States Patent No. 4,570,648, February 18, 1986, 9 pp.

Novel odorant and/or flavoring substances are described, including the three closely related esters 2,3,6,6-tetramethyl-2-cyclohexene-1-carboxylic acid ethyl ester, 2,3,6,6-tetramethyl-1-cyclohexene-1-carboxylic acid ethyl ester, and 2-methylene-3,6,6-trimethylcyclohexane-1-carboxylic acid ethyl ester where the ethyl group can also be replaced by either C_{1-4}-alkyl or C_{2-4}-alkenyl groups. The ester mixtures enhance tobacco flavor with fruity, flowery, and woody aromas. Among the claims are a tobacco flavoring wherein the ester group is ethyl and the ester mixture consists of 85 to 100 percent of the first ester, 0 to 5 percent of the second ester, and 0 to 15 percent of the third ester. Other applications of flavorants are described. (Auth. Abs. Mod.)

TOBACCO MANUFACTURING AND PROCESSING

86–1246. Fischer, E.B.; Lilly, A.C. **Expanded Wrapper and Smoking Articles Including Same.** United States Patent No. 4,574,821, March 11, 1986, 7 pp.

The expanded wrapper described has a flexible layer of honeycombed sheet material sandwiched between two layers of conventional cigarette paper for stiffening, providing firmness and rigidity independent of smoking material density. The inner layer prevents shreds of tobacco from escaping into the open honeycomb cells; the outer wrapper is only for appearance. Density of tobacco in a cigarette is generally associated with the firmness characteristics of the cigarette, primarily because conventional cigarette wrappers have little structural strength. The expanded wrapper allows less dense tobacco rods to be used, while the cells of the honeycomb stiffener can be filled with various suitable substances, such as menthol, other flavorants, or a compatible filler material. (Auth. Abs. Mod.)

86–1247. Loring, M.T. **Method and Apparatus for Gratifying Excessive Oral Needs.** United States Patent No. 4,569,136, February 11, 1986, 3 pp.

A sucking device resembling a pipe but containing a consumable liquid is described as an alternative to smoking tobacco. The device comes equipped with an adjustable needle valve to regulate the sucking power required to draw the liquid into the mouth. The bowl of the device is provided with a cover consisting of a diaphragm valve or other one-way opening check valve to allow air to enter the bowl, thereby preventing the formation of a vacuum. The pipe can be used to satisfy oral needs in a socially acceptable manner. (Auth. Abs. Mod.)

86–1248. Nichols, W.A.; Newsome, R.W. **Filter Cigarette.** United States Patent No. 4,570,649, February 18, 1986, 7 pp.

The filter cigarette described provides variability in degree of air dilution that can be adjusted by the smoker. Variability is accomplished by using a tipping paper that is divided into first and second bands. The first band extends from the mouth end of the filter plug to a position adjacent to the tobacco rod and overlying the rod end band of the plug wrap. The second band abuts the first band and overlaps and attaches the rod end of the filter plug to the abutting end of the tobacco rod. The first band and the rod end band of the plug wrap each have a single opening. The first band is rotated about the longitudinal axis of the filter plug, thereby rotating the opening in the tipping paper into varying degrees of registry with the opening in the filter plug wrap, allowing varying amounts of air to be combined with the smoke and thus varying the air dilution value of the cigarette. The filter cigarette described can be readily manufactured on conventional cigarette-making equipment.

See also **86–1029**

86–1249. Nowers, J.R.; Williams, R.E. **Method and Apparatus for Ventilated Cigarette Manufacture.** United States Patent No. 4,569,359, February 11, 1986, 4 pp.

The apparatus described for manufacturing ventilated cigarettes provides a method for perforating tipping paper and the completed cigarette by a variable control circuit that responds to porosity measuring or dilution testing devices. The first perforator (not readily susceptible to control) punctures the tipping paper. The controlled perforator (preferably laser) responds to a device measuring porosity of the tipping paper based on initial perforations, and automatically adds needed perforations. (Auth. Abs. Mod.)

86–1250. Okieimen, F.E.; Akintola, E.O. **Contamination of Dairy and Tobacco Products by Trace Quantities of Nitrosodiethanolamine (NDELA).** *Bulletin of Environmental Contamination and Toxicology* 35(4):466-470, October 1985.

Tobacco products had the highest levels of N-nitrosamines in an investigation of contamination in alcoholic beverages, milk, meat, and tobacco products in Nigeria, which was prompted by earlier findings of relatively high level contamination of alcoholic beverages and meat products. Nitrosamine contamination of tobacco ranged from 3.88 to 34.16 μg/kg (17.3 μg/kg mean value). Of the five types of tobacco products examined, tobacco leaf had the lowest levels of nitrosodiethanolamine (NDELA) and tobacco snuff had the highest: 3.88 μg/kg vs. 34.16 μg/kg, respectively. Mean value for cigarettes, cigars, and pipe tobacco were 15.0 μg/kg, 21.41 μg/kg, and 23.34 μg/kg, respectively. It is suggested that differences between NDELA levels in tobacco leaf and tobacco products may be attributed to tobacco processing additives containing nitrosamine precursors or tobacco processing that accentuates nitrosation reaction. NDELA levels of dairy products were 0.3 to 5.5 μg/kg; alcoholic beverages, 7.8 to 19.2 μg/kg; and meat products, 0.6 to 68.9 μg/kg.

86–1251. Pinkerton, W.; Hawthorne, S.J.A. **Buccal End Device for a Smoking Rod.** United States Patent No. 4,574,820, March 11, 1986, 5 pp.

The filter plug described has a hollow tubular core with a cross wall containing openings of particular size and shape. Ventilating air drawn through perforations in a tipping wrapper and through a porous inner wrapper is mixed with smoke drawn through the tobacco rod. The mixture is sucked through the openings, promoting particular mixing and pressure drops effects. (Auth. Abs. Mod.)

TOBACCO ECONOMICS

86–1252. Banzhaf, J.F., III. **The Socio-Economic Implications of Smoking and the Non-Smokers' Rights Movement.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 477-482.

The war on smoking has to be fought on the economic battlefield to dramatize the tremendous and totally unnecessary costs of smoking to society because (1) the tobacco industry is opposing (successfully, in some cases) antismoking proposals on the basis of economic benefits to industry; (2) regulatory agencies are basing more decisions on cost benefit analyses; and (3) smokers need to carry more of the economic burden of the deadly habit. Nonsmokers, who are now in the majority in most adult populations, are forced to bear most of the costs of smoking through higher taxes and larger insurance premiums and in other ways. It is suggested that (1) the tobacco industry be made financially liable to nonsmokers injured or killed in cigarette-caused fires in hotels, hospitals, airplanes, and other public places; (2) the industry pay its fair share to asbestos-injured workers, since smoking is at least as responsible as asbestos, and that Congress insist on such payment before any asbestos industry bailout measures; (3) health insurance members insist smokers pay a fair share of extra tobacco-related health care expenses; and (4) smokers make up for extra costs of Medicare, Medicaid, and veterans' benefits inflicted upon nonsmokers. Emphasizing costs to nonsmokers adds strong economic disincentives to continuing smokers.

86–1253. Beljo, J. **Changes on the Yugoslavian Tobacco Market.** *Tabak Journal International* 6:452, 454-455, December 1985.

Leaf tobacco production in Yugoslavia increased 17 percent to 82,287 metric tons (t) in 1984, with the highest increase in production of Burley. Production for Virginia decreased, but demand is still high and tobacco companies are encouraging bigger Virginia crops. Exports of leaf tobacco were slightly down, but imports increased. Since 1983, new principles in the regulation of prices for tobacco and tobacco products have been put into effect. Essentially, the Association of the Tobacco Industry works out pricing based on supply and demand on the domestic market, costs of production, and price levels of foreign markets. Production of cigarettes amounted to 55,685 t, with most sold domestically. Sales of cigarettes dropped for the first time in 1984 after a steady increase in consumption. The change in consumption patterns is attributed to a decline in the standard of living owing to a steep rise in prices. Low-priced cigarettes (Best, York, and Super Filter) are best sellers. Manufacture of low-quality cigarettes is encouraged through a tax system that lowers the price. Fifteen million people between the ages of 15 and 17 are potential smokers, according to official statistics. One of three in this group smokes 1.5 packs/day, or about 2,800 cigarettes/year.

86–1254. Bickers, C. **Dispute Over Tobacco Policy Costs N.C. Grange Leader His Post.** *Tobacco International* 187(22):29-30, November 1, 1985.

The North Carolina Grange master's bid for reelection was defeated following his support for a plan, first proposed by Congressman Charles Rose (Democrat, N.C.), to earmark a portion of the Federal excise tax on cigarettes to fund the tobacco program. The Grange adopted a resolution specifically opposing use of cigarette excise tax revenues for any purpose. The Grange also resolved to oppose the end of lease and transfer of tobacco quota (production rights) scheduled to take place after the 1986 session and to oppose trade retaliation against Japan for placing barriers against importation of American-manufactured cigarettes. Grangers believe the Japanese adequately compensate for excluding U.S. cigarettes by large purchases of American leaf. It is believed that the North Carolina Grange is being pushed back into the progressive camp of tobacco farmer organizations, along with other organizations such as the N.C. Tobacco Growers Association, the Virginia Farm Bureau, and the Virginia Tobacco Growers Association, after having drifted toward the conservative camp of the N.C. Farm Bureau over the past year. A shift in momentum is predicted from the conservative Rose bill to the progressive Helms-Ford-McConnell bill.

86–1255. Burry, R.D. **PM, RJR Expansions Defensive; No Smokeless Decline; Leaf Prices Off.** *Tobacco International* 187(26):18-42, December 27, 1985.

Tobacco-related earnings of Philip Morris (PM), R.J. Reynolds (RJR), and other key tobacco corporations are analyzed to arrive at projections for 1985 to 1986. Both PM and RJR have recently added major food product lines (General Foods and Nabisco, respectively). Detailed breakouts of revenues, operating and nonoperating incomes, and dilution effects of the acquisitions are tabulated. For comparison, similar results are given for American Brands, U.S. Tobacco Company, B.A.T. Industries, and Universal Leaf Tobacco. Also included are data on cigarette and cigar production, oral tobacco shipments, and trends in cigarette and leaf tobacco prices. Tobacco usage increases, lower price supports, and government release of excess tobacco portend reduction in leaf prices.

86–1256. Chase Econometrics. **The Economic Impact of the Tobacco Industry on the United States Economy in 1983. Volume I. The Impacts on the National Economy.** Bala Cynwyd, Pennsylvania, Chase Econometrics, 1985, 179 pp.

Analysis of the economic impact of the United States tobacco industry on the domestic economy during 1983 showed that 28.3 billion dollars was spent on tobacco products. The 9.79 billion dollars paid to Federal, State, and local governments in tobacco excise and sales taxes represented 34.6 percent of total consumer expenditures on tobacco products. If excise and sales taxes are included with income and corporate profit taxes, the tobacco core sectors paid out more than 13.46 billion dollars in Federal, State, and local taxes (47.6 percent of total consumer expenditures). The tobacco core sectors employed more than 414,000 persons during 1983; paid compensation totaled more than 6.72 billion dollars. Supplier industries produced more than 30.3 billion dollars in goods and services to meet production requirements of the core sectors. The supplier industries employed 296,000 workers and paid out almost 7.4 billion dollars in compensation. Combined, the tobacco core sectors and supplier industries accounted for 31.5 billion dollars of gross national product and employed 710,000 workers. To meet consumption demands of workers and their families impacted by the tobacco industry, 1.59 million workers were employed to produce the necessary goods and services in all business sectors, which accounted for 50.6 billion dollars of gross national product.

86–1257. Davis, R.M. **Promotion of Cigarettes in Developing Countries.** *Journal of the American Medical Association* 255(8):993, February 1986.

In 1984, U.S. manufacturers exported 56.5 billion cigarettes and 246,156 tons of unmanufactured tobacco to Third World countries and have been exporting agricultural technology and providing assistance so that these countries can grow tobacco and manufacture their own cigarettes. European competitors are also aggressively marketing products in the Third World. A 1982 survey of tobacco legislation showed that 22 of 31 developed countries had extensive restrictions or a total ban on advertising of tobacco products compared with only 5 of 26 developing countries (Egypt, Jordan, Cyprus, Singapore, and Mozambique). The extensive advertising of Marlboro cigarettes in a small Latin American country is used to illustrate the freedom with which cigarettes are promoted, noting that such campaigns may also promote the belief that cigarette smoking is not a serious health hazard. The goal of the international medical and public health communities should be that all citizens receive accurate, comprehensive, unbiased information on the health hazards of smoking.

86–1258. Maruschke, S. **Large Crop in the Dominican Republic.** *Tabak Journal International* 6:446, December 1985.

The Dominican Republic tobacco crop in 1984-1985 yielded 534,900 quintals (1 quintal is equal to 100 pounds or 45.36 kg) of dark leaf (Criollo, Olor, and Piloto Cubano); 103,084 quintals of bright leaf (Virginia and burley), and 2,810 quintals of wrapper. Marketing of Criollo met with difficulties, which resulted in prices paid to farmers that were about 30 percent below production costs. In September 1985, 85 percent of Criollo had been sold. To resolve the problem, the Dominican Government (through the Tobacco Institute) provided 2 million RD dollars to five local grower associations to pack over 20,000 quintals of Criollo in the hope of finding some outlet through official negotiations. In recent weeks, an increase in demand for Criollo, possibly owing to purchases by the French monopoly and other late-arrival customers, caused prices to soar, but too late to help the growers. As a consequence, the Dominican Tobacco Institute has reduced planting of Criollo in 1985/1986 by 20 percent. Olor and Piloto Cubano plantings will remain the same as last year, but burley and Virginia production may also be reduced. Expectations point to a smaller Dominican crop in 1986.

86–1259. Maxwell, J.C., Jr. **Cigarette Sales Off About 1 Percent; Marlboro Near Quarter of Market.** *Tobacco International* 187(26):46, 48, December 27, 1985.

Preliminary year-end figures show that sales of leading brands of cigarettes either dipped or remained flat in 1985; however, Marlboro sales continued to improve, increasing its market share to 22.3 percent. Newport sales hit a new high; 3.4 percent ahead of last year. Retail sales are running about 1 percent below the 1984 level. The most dynamic segment of the 1985 market was the price—value category: no-frills and store brands from Liggett and Myers and Brown and Williamson; generic brands (Doral) from R.J. Reynolds; and midprice brands (Stride, Century, Richland, and Players Lights 25s). The market share for discount brands was 7.2 percent in 1985 compared with 5.5 percent in 1984; however, the growth rate was below that of previous years. In general, 1985 saw little change in market shares of the leading brands. Virginia Slims (Philip Morris) showed continued progress, aided by extension of the 120s line in the fourth quarter. The 35.7 percent total market share for Philip Morris set a record.

86–1260. McKenna, W. **Canada's Marketing Agency Stalled; Grower-Manufacturer Pact Needed.** *Tobacco International* 187(22):26-28, November 1, 1985.

Canada's proposed new national marketing agency for tobacco has been stalled for lack of information on a farmer cost-of-production formula, which was not formally addressed during the hearings. A detailed cost-of-production study conducted on the 1983 crop, provided to the National Farm Products Marketing Council, was not available in time for the original hearings. The cost-of-production costs were based on the costs of 125 growers (out of approximately 2,500), and manufacturers questioned the conclusions reached. Manufacturers were afraid that the "pick-and-choose" system may have inflated costs of production by 40 million dollars for the 1983 crop, which would have resulted in substantially higher costs for the 1984 and 1985 crops. In October, the Tobacco Board and the Manufacturers' Council resumed talks for setting the amount of tobacco to be grown and the minimum acceptable price/pound for tobacco. A large number of farmers have indicated satisfaction with the prices received on past markets. Others feel that the tobacco board has already received a realistic price offer for the 1985 crop.

86–1261. Naguib, M.R. **Egypt-International Firms Pact Signed; Eastern Profitable Again.** *Tobacco International* 187(26):68-69, December 27, 1985.

The Eastern Company, Egypt's only cigarette maker, increased production 7.2 percent (44.3 billion to 47.5 billion) in 1984 and through mid-1985 for a profit of 8.120 million Egyptian pounds. Recent acquisition of the El Nasr company enabled Eastern to (1) meet smoker demand for Cleopatra, the most popular cigarette in Egypt; (2) establish stable marketing of all tobacco products and maintain surpluses for export; and (3) convert El Nasr sales centers for its own use. Daily production is 180 million cigarettes and daily consumption is about 150 million, leaving 30 million for export. All tobacco is imported, since no tobacco is grown in Egypt. Beginning in January 1986, foreign brands from the four largest international companies (British-American, Kent and DuMaurier; Philip Morris, Marlboro and Merit; R.J. Reynolds, Camel and Winston; and Rothmans, two brands) will be produced in Egypt. The foreign companies will import the tobacco and provide packing materials. Six Egyptian pounds will be paid to Eastern for each 1,000 foreign cigarettes produced, 12.2 pounds/1,000 cigarettes to customs authorities, and 6.3 pounds/1,000 cigarettes for consumption taxes. It is estimated that Eastern's share will reach 25 million pounds annually.

86–1262. Neuber, D. **A Year of Change for Philip Morris.** *Tabak Journal International* 6:458, December 1985.

A restructuring of Philip Morris, Incorporated (PMI), in 1985 created a holding company called Philip Morris Companies, with PMI as a fully owned subsidiary. A holding company owns and controls stocks, securities, and financial interests of other companies. As a result of restructuring, designed to produce "a clearer delineation, separation, and understanding" of the tobacco businesses, PMI comprises (1) Philip Morris U.S.A., whose major brands are Marlboro, Benson and Hedges 100s, Merit, Virginia Slims, Parliament Lights, and Players; (2) Philip Morris International, manufacturer and marketer of a variety of cigarette brands through affiliates, licensees, and export sales organizations and manager of Seven-Up International operations; (3) Miller Brewing Company; (4) The Seven-Up Company; (5) Mission Viejo Realty Group, Inc.; and (6) General Foods, whose acquisition is further evidence of tobacco industry diversification. With predictions that cigarette sales would decrease 5 to 10 percent by 1995, tobacco companies reacted by diversifying product lines. In 1984, sales by General Foods, a company that employs 68,000 people, amounted to over 8 billion dollars. The acquisition makes PM the largest U.S.-based consumer products company. Another tobacco company, R.J. Reynolds, recently acquired Nabisco, whose annual sales amount to 19 billion dollars.

86–1263. Palacpac, O.S. **Exports Off, But Imports Too; Middle East Emerges as Customer.** *Tobacco International* 187(22):6, 8-9, 11-12, November 1, 1985.

Philippine leaf production increased in 1984, giving a much-needed boost to the economy, which had faired poorly over the last 3 years. Meanwhile, two bills seeking to ban advertising of cigarettes in print and broadcast media were defeated. Exports decreased slightly, and imports decreased drastically. Improved leaf production was attributed to periodic increases in support prices. Cigar filler (native) tobacco reached 34 million kilos; Virginia, 54.2 million kilos; and burley, 20.6 million kilos, an average 35 percent increase over 1983 figures. Government revenues amount to 128.8 million dollars annually in taxes, duties, license fees, and other charges. Some 14.2 million Filipinos (28.4 percent of the total population) depend on the tobacco industry for their livelihood. The United Arab Republic (Egypt) was the largest importer (3.16 million kilos, 4.73 million dollars), followed by Spain (3.81 million kilos, 4.10 million dollars), Japan (1.92 million kilos, 4.03 million dollars), and the United States (3.68 million kilos, 3.10 million dollars). United Arab Republic purchases increased significantly over 1983.

86–1264. Rao, P.S. **Selling by Auction Proves Successful in India.** *Tabak Journal International* 6:488, 490-491, December 1985.

Excessive tobacco production in 1983 and 1984, which resulted in an accumulation of 35,000 metric tons (t) of flue-cured tobacco, prompted the Tobacco Board of India to hold production in Andhra Pradesh and Karnataka to 90,000 and 15,000 t, respectively. Compulsory auction marketing of 1984 and 1985 flue-cured tobacco crops was introduced by the Tobacco Board, based on success of experimental auctions held in Andhra Pradesh and Karnataka in 1983. Eight auction centers were opened. Farmers graded tobacco according to plant position, and the Board announced support prices for each grade. It was understood that graded bundles not reaching support price levels would be taken over by the trade wing of the Board. Twenty-nine companies participated in the auction, and although some hard bargaining ensued, farmers were satisfied that tobacco fetched adequate prices for the first time and credited auction marketing for the success. Larger choices in grade and type of tobacco, despite the constraint of slightly higher prices, met with merchant approval.

86–1265. Rizio, D. **Promotional Tactics of the US Cigarette Manufacturers.** *Tabak Journal International* 6:483-484, December 1985.

With overall cigarette consumption on a downward trend, the U.S. cigarette manufacturing industry is increasing its efforts to attract smokers and thereby increase sales, through traditional gimmicks that include coupons for special purchase items or cents off coupons, free gifts with purchases, or souvenirs from sponsored events. As diverse as the brands themselves, the promotional tactics of the most active firms (Brown and Williamson and R.J. Reynolds) are examined, offering insight into types of marketing techniques. Coupon saving, a Brown and Williamson tradition since 1932, is also the technique used by Liggett and Myers and R.J. Reynolds, which has a special Promotional Products Group (PPG) charged with developing special souvenir items for sponsored events (e.g., Winston Million Race posters of the top 12 drivers can be purchased with two packs of cigarettes). Cigarette lighters, caps, T-shirts, coolers, sunglasses, and other items are also available through cigarette purchases. Sophisticated research is carried out by the PPG to "match" the promotional item to the cigarette brand (e.g., colors for Camel caps and T-shirts are warm and golden, while shades of green are used for Salem items).

86–1266. Seuss-Calandrelli, D. **Italian Tobacco Crop Considered Satisfactory.** *Tabak Journal International* 6:444-445, December 1985.

Climatic conditions during 1985 favored cultivation of leaf tobacco in all parts of Italy, and an increase of 30 percent in bright and 20 percent in Levantini production is anticipated. However, market stagnation and considerable unsold stocks from 1984 production are causing concern. Opening of the Cuban market may reduce some of the surplus, and Italians hope to place a certain quantity in the United States. Production increased by 3.4 percent over the previous year (from 156,023 metric tons (t) of leaf tobacco in 1983 to 161,332 t in 1984). Burley production increased 2.5 percent over the previous year (61,917 vs. 60,428 t), bright production remained relatively unchanged (29,396 vs. 29,889 t), and Havana production increased 6.1 percent (22,132 vs. 20,863 t). Kentucky production increased 16.6 percent (12,389 vs. 10,622 t), and Xante production increased 10.0 percent (11,635 vs. 10,574 t). Of 1983 production, 44,700 t were sold to the Italian Monopoly, 27,900 t to the EEC, 57,900 t to non-EEC countries, and 2,200 t to the State Agency for Intervention on the Market of Agricultural Produce as unsold.

86–1267. Simpson, D. **Countering the Opposition.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 615-621.

Tobacco industry opposition to smoking control measures can be divided into (1) antihealth propaganda; (2) promotion; (3) economic propaganda; and (4) the issue of social acceptability. The most frequent argument, i.e., no causal relationship between smoking and ill health has been proved, can be combated with simple truth. It is the job of antismoking groups to ensure that scientific evidence about smoking reaches as wide an audience as possible. Most tobacco industry arguments to preserve promotion of its products are transparent and easily exposed, and activism by a united medical profession does have an impact. Not all advertising industry officials accept tobacco advertising business. Arguments concerning the effect of tobacco on the economy (i.e., jobs and revenues from taxation revenue) require more public education, e.g., higher taxes on tobacco products raise revenues while decreasing consumption. The infringement-of-freedom issue lacks strength in that smokers, far from exercising freedom of choice, are the real victims of loss of freedom. Counter arguments involving children and their need to be protected are irrefutable.

86–1268. Tabak Journal International. **Statistics.** *Tabak Journal International* 6:506-507, December 1985.

Tobacco production and trade statistics for selected countries reveal that in 1984, the Netherlands led in production of chewing tobacco and snuff for the third consecutive year with 32,326 metric tons (t), importing 8,997 t and exporting 27,379 t. Data for 1984 also show that (1) the United Kingdom was the world's second largest producer with 11,500 t, importing 10,987 t and exporting 10,093 t; (2) France produced 5,198 t (excluding sheet tobacco) and imported 2,682 t and exported 22,926 t (including 22,345 t sheet tobacco); (3) South Africa produced 9,376 t (pipe tobacco only), all for internal consumption; (4) the Federal Republic of Germany produced 7,618 t, imported 24,467 t, and exported 4,700 t; (5) Belgium-Luxembourg produced 6,307 t, imported 13,559 t, and exported 6,382 t; (6) Canada produced 6,568 t, imported 1,277 t, and exported 157 t; and (7) Denmark produced 4,658 t, imported 815 t, and exported 2,272 t. Production figures for the United States were not available for 1982, 1983, and 1984, but 1,824 t were imported and 16,198 t were exported in 1984. Production, import, and export statistics are provided for 31 other selected countries.

86–1269. Tabak Journal International. **US Market for Smoking Tobacco Declines.** *Tabak Journal International* 6:463, December 1985.

Changing market trends are causing U.S. smoking tobacco sales to decline, according to tobacco industry analysts. Total smoking tobacco sales decreased 10.2 percent in 1984 to 30,243 thousand pounds, down from 33,676 thousand pounds in 1983. The trend continued during the first half of 1985, with sales off 8.7 percent from 1984. Domestic pipe tobacco sales declined 15 percent, but imported pipe tobacco sales, which had declined in 1983 and 1984, increased 8 percent during the first half of 1985. Sales of roll-your-own smoking tobacco were up in 1985, but below the recent 1983 high point. The roll-your-own market, according to the Tobacco Merchants Association, tends to be volatile and can reverse at any time. Smoking tobacco, it is concluded, remains in the shadow of smokeless tobacco products such as snuff and chewing tobacco, and cigarettes.

86–1270. Tobacco Reporter. **Canadian Manufacturers Cut Prices to Regain Market.** *Tobacco Reporter* 112(12):10, December 1985.

Heavy provincial and Federal tax increases caused a decline of more than 8 percent in sales of Canadian cigarettes in the first 8 months of 1985, sparking a price war as manufacturers maneuvered to increase market shares. In Quebec and Ontario, Rothmans offered its No. 7 brand in regular length (full flavor and lights) in packs of 30 for the same price as a pack of 25, following their withdrawal from the Canadian Tobacco Manufacturers Council. Imperial reacted by cutting prices on cartons of Peter Jackson in Ontario, Quebec, and British Columbia. Benson and Hedges cut prices on newly introduced cartons of Special king size and Special king size lights in Ontario. RJR-Macdonald Inc., declaring that it was not involved in discounts, also slashed prices on Tempo cigarettes. None of the participants are predicting the next move, but smokers who have been incensed over steadily increasing tobacco taxes, are enjoying the first price war in memory. However, nonsmokers are fuming at what they see as lack of government support for the campaign to ban all tobacco use.

86–1271. Tobacco Reporter. **Strong Demand Prevails.** *Tobacco Reporter* 112(12):32-34, December 1985.

Production of light leaf tobacco by major growers remained stable primarily because of poor weather conditions and soft demand. Overabundant rain was one factor that kept the Zimbabwean crop from reaching its target level. In Brazil, early season rains aided in the attempt to hold production to an acceptable range. Production was cut in the United States, but Canadian producers set the same production target as last year. Demand for most leaf remained strong throughout the marketing seasons. Record high prices were set in Zimbabwe, while in the United States leaf purchases surpassed the designated amount to trigger the 15-cent rebate. In Brazil, buyers returned to the market after the packing season was over, increasing their purchases. Production levels for selected countries are presented.

86–1272. Tobacco Reporter. **Recovering Markets Expand Volume.** *Tobacco Reporter* 112(12):34-36,38, December 1985.

World exports of unmanufactured tobacco in 1984 grew by more than 2 percent to 1.4 metric tons, owing to higher world consumption with an expanding world economy, lower stock levels among importers, and lower prices in many countries. Exports increased in Brazil (6 percent), Canada (9 percent), Greece (12 percent), Italy (21 percent), Malawi (40 percent), and the United States (3.5 percent). Trade was reduced in Argentina by 14 percent; the Dominican Republic, 13 percent; the Federal Republic of Germany, 12.5 percent; Guatemala, 35 percent; India, 3.5 percent; the Republic of Korea, 9 percent; Yugoslavia, 36 percent; and Zimbabwe, 8 percent. Preliminary figures for 1985 show that exports of unmanufactured tobacco will expand beyond last year's level. Continuing improvement in the world economy and higher consumption are helping to push exports to near-record levels. Imports increased significantly in the United Kingdom (21 percent), Denmark (91 percent), and Thailand (540 percent). Imports declined in the United States (21 percent) and the Federal Republic of Germany (17 percent). A review of trading activity in selected countries is presented.

86–1273. Tobacco Reporter. **Tobacco Output Rose 4 Percent in 1985.** *Tobacco Reporter* 113(2):36, February 1986.

World tobacco production for 1985 is estimated at 6.8 million metric tons, higher than previously forecast but 2 percent lower than the 1982 record-high output of 6.9 million tons. Flue-cured production for the year is estimated to reach 3.5 million tons. China anticipates a 2 million ton increase in output; the United States, 356,869 metric tons. Malawi, Bangladesh, Malaysia, Kenya, Zambia, Portugal, Syria, Chile, Costa Rica, and Panama all report higher ouput, adding to gains in the flue-cured supply. Smaller output is anticipated in Zimbabwe, Taiwan, Yugoslavia, Bulgaria, Nigeria, and West Germany. The 1985 burley crop should total 713,274 metric tons. Increased output is reported for Malawi, Hubei Province in China, the Republic of Korea, Argentina, Chile, Syria, Panama, Bangladesh, and Kenya, while smaller crops are forecast for the United States, Yugoslavia, Bulgaria, West Germany, Portugal, Zambia, and Malaysia. Oriental leaf estimates have dropped and prolonged drought has contributed to smaller crops in Bulgaria, Yugoslavia, and Romania. Dark air/sun-cured tobacco output will total about 1.2 million tons for the year, higher than anticipated, based on larger crop production in China, West Germany, and Malawi.

86–1274. Yayehyirad, K. **Socio-Economic and Cultural Implications of Health Interventions: The Case of Smoking in Ethiopia.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 505-511.

The popularity of smoking, the difficulty of breaking smoking habits reinforced by skillful advertising, and the leverage exerted by transnational tobacco industries make antismoking recommendations of health professionals difficult to implement in Ethiopia. Tobacco is important to the general economy, accounting for 5 percent of the total industrial gross value of production, over 1 percent of all industrial employees, and 1.6 percent of total government revenue. Households spent from 1.5 to 2.9 percent of income on tobacco in 1975 compared with 1.8 to 3 percent spent on medical care. Malignant diseases such as lung cancer are not specifically mentioned in medical reports. Myocardial infarction and ischemic heart disease in general are extremely rare in Ethiopia, or never associated with smoking. Other diseases, e.g., gastritis and duodenal ulcers, are quite frequent, but are probably associated more with dietary habits than with smoking. Currently, poor health status among

Ethiopians is the result of very low income, unemployment and underemployment, poverty, malnutrition, and a high rate of morbidity and mortality from infectious disease, which tend to overshadow the potential health problems associated with smoking. It is suggested that smoking can be eradicated only through political means at both national and international levels, primarily because tobacco interests are transnational.

See also, **86–1222, 86–1277, 86–1278, 86–1279, 86–1295**

LEGISLATION

86–1275. Banzhaf, J.F., III; Pfeiffer, P.N. **Legal Action on Smoking and Health.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983.* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 513-517.

Administrative and judicial actions may be more effective in combating smoking than legislative changes or educational programs. Although a lobbying campaign can sometimes be effective, any attempt to pass legislation requires major commitment. It will face strong opposition (backed by unlimited funds) from the tobacco industry, which will try to influence opinions of legislators and the public, and faces failure or compromises at any point in the legislative process where the tobacco industry registers strength. The broad powers of regulatory agencies are not subject to political pressures or to campaign contributions, and failure to regulate or enforce regulations are subject to review by nonpolitical, usually impartial courts. Court branches are especially entrusted with defense of the weak and politically unorganized and lean toward creation of new rights where an important need exists. The granting by the Federal Communications Commission, under the "fairness doctrine," of equal time to television antismoking messages in 1967 just after Congress voted to protect cigarette companies from the Federal Trade Commission is just one example. Another example is the origination of no-smoking sections on airplanes, granted by the Civil Aeronautics Board and giving birth to nonsmokers' rights. Various theories under which the courts and agencies are beginning to recognize and protect the rights of nonsmokers are discussed.

86–1276. Garner, D.W. **The Legal Implications of Cigarette Smoking.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 523-532.

The tobacco industry, which markets the most dangerous product sold in America, is the only industry that has been sheltered from product liability. Liability can be imposed on a tobacco company in some jurisdictions by a plaintiff (i.e., child or spouse diseased or disabled as a result of inhaling a family member's smoke) if a jury finds that cigarettes are "unreasonably dangerous." This also applies to workplace smoking. Cigarettes are not self-extinguishing and are therefore defective in the eyes of the law, particularly if the innocent victim (and nonsmoker) of a cigarette-started fire did not consent to be near the cigarette or smoker. Lack of awareness of the extent and instance of tobacco risks is the backbone of the smoker's case against the cigarette manufacturer. Only 47 percent of women interviewed by the Federal Trade Commission were aware that smoking during pregnancy increases the risk of stillbirth or miscarriage; 40 percent of smokers did not know that smoking shortens life expectancy; and children do not realize that 85 percent of adolescents who smoke more than a one cigarette become regular dependent smokers. It is suggested that "failure to warn" the public of the dangers of smoking is an unparalleled display of corporate indifference and exposes the tobacco industry to civil liability. Smokers and nonsmokers can also profit from the common law trend toward relieving all plaintiffs of the burden of proving which product did the damage. Other aspects of the problem, including compensation, are also discussed.

86–1277. Glantz, S.A.; Loveday, P.L. **The Tobacco Industry's Political Tactics in California Since 1978.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983.* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 539-548.

Two statewide California campaigns to enact legislation to protect nonsmokers in public places and in the workplace, which the tobacco industry strongly opposed, are documented. The campaigns represented the largest public debate anywhere in the United States on the issue of smoking. The stakes were very high: cigarette sales in California account for about 2.5 billion dollars of annual sales of 25 billion dollars in the United States. During the 1978 campaign, 99.7 percent of the 6.4 million dollars spent to defeat Proposition 5 came from major cigarette companies, and exceeded the combined spending by both candidates for governor of California. Efforts to disguise tobacco industry involvement are revealed. Other methods used to sway public opinion through misinformation, introduction of "look-alike" bills in the State legislature, surreptitious funding, anonymity (Californians for Common Sense), and circumvention strategies based on closely guarded results of

Roper polls of U.S. attitudes toward smoking are described. The campaigns, although failing to enact the proposed legislation, made smoking a major public issue in California. Nonsmoker consciousness was raised and smoking became less socially acceptable than in many other parts of the United States.

86–1278. Goldsmith, M.F. **Tobacco-Addiction-Death Link Shown But Labels Don't Tell It.** *Journal of the American Medical Association* 255(8):997-998,1003, February 1986.

Compromises with tobacco lobbyists removed the words "addictive" and "death" from the four proposed warning labels for cigarette packages. The tobacco industry contends that conclusive evidence for such statements is lacking, and has fought against including the word "addictive" because of the legal responsibility issue. The majority of the medical profession does not agree, but has been unable to prevail in Congress, demonstrating the weakness of the legislative body and the power and influence of tobacco companies. By sticking to the contention that smoking is not addictive and smokers have a free choice to quit at any time but choose not to, the tobacco industry has managed to win every lawsuit brought against it so far. It is suggested that greed is the major problem: the tobacco industry is willing to kill to keep profits up. A bill was recently passed requiring health warning labels on snuff and chewing tobacco, used by some 10 million Americans (many of them adolescents); however, the labels would not warn against addiction.

86–1279. Joossens, L. **Strategy of the Tobacco Industry Concerning Legislation on Tobacco Advertising in Some Western European Countries.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1963, pp. 549-554.

Among tobacco industry strategies to circumvent bans on tobacco advertising are (1) applying political pressure, (2) using financial resources, (3) promoting misleading information, or (4) drawing up codes. It is suggested that two antismoking advocates, Patrick Jenkin and Sir George Young of the British Department of Health and Social Security, were replaced as a result of political pressure. Following the change, a British press commentary noted that the tobacco industry did not expect the present Government "to take a tough line on cigarette advertising." A referendum on a tobacco advertising ban in Switzerland was rejected (59 percent to 41 percent) and postelection analysis confirmed that the tobacco industry spent eighteen times as much in advertising to defeat the ban as was spent by supporters of the ban. In Norway, misleading information promoted by the tobacco industry proposed that a tobacco advertising ban had no effect on consumption; however, the opposite was true. The proportion of daily smokers declined 12 percent among men and stabilized among women. The effect of voluntary codes (less binding than legislation and noncompulsory) and how they have been used by the tobacco industry to circumvent the spirit of agreements are reviewed for a number of European countries.

86–1280. Journal of the American Medical Association. **Media Advertising for Tobacco Products.** *Journal of the American Medical Association* 255(8):1033, February 1986.

Resolution 114(A-85) calls on the American Medical Association (AMA) to oppose all media advertising of tobacco products by "initiating legislation prohibiting such advertising." The AMA has declared unequivocal opposition to use of tobacco and a goal of achieving a smoke-free society by the year 2000. Since the 1971 ban on radio and television advertising, tobacco companies have become the largest advertisers in newspapers, magazines, and outdoor displays, and AMA efforts to convince newspapers and magazines to refuse tobacco advertising voluntarily has had only modest success. Only 3 of the 20 most widely circulated magazines in this country do not accept cigarette advertising, and it is suggested that many publications that derive revenue from cigarette advertising are reluctant to publish editorials relating to the issue of smoking and health. A complete media ban, however, might shift advertising efforts to other forms, including sponsorship of sporting events and cultural programs. Continuous monitoring of all advertising activities is recommended.

86–1281. Milio, N. **Health Policy and the Emerging Tobacco Reality.** *Social Science and Medicine* 21(6):603-613, 1985.

The policy implications of the changing economics of tobacco and a political strategy to move policy in more healthful directions are discussed. The smoking and health issue is analyzed from the viewpoint of creating environments conducive to health (e.g., developing policies that provide incentives to producers and consumers to make more healthful choices) and creating a social and political climate that will encourage policymakers to choose more healthful policy options. Policy, which involves dealing with economic changes, requires simultaneous efforts in (1) education and information: posing the smoking and health issue in light of changing conditions, and providing relevant data (both economic and value-oriented) to policymakers and the media; and (2) in environment and organization, including improving the feasibility of policy changes by establishing means for transition planning for the tobacco economy. Experience has shown that successful policymaking has taken advantage of changing environments. First, advocates had to be aware of broad economic, social, organizational, and political changes, and then had to reinterpret the issue and communicate it in politically relevant ways to particular audiences, thereby influencing the political environment and, in turn, policymakers. (Auth. Abs. Mod.)

86–1282. Omar, S.; El Sayed, H. **Anti-Smoking Legislation in Egypt.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on*

Smoking and Health, Winnipeg, Canada, 1983, Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 575-579.

Antismoking legislation enacted in June 1981 in Egypt (1) mandated health warnings on tobacco products; (2) prohibited tobacco advertising in areas of sports activities and in the presence of young people; (3) limited levels of dangerous substances such as tar in tobacco products; (4) prohibited smoking in public places and in public transport; and (5) limited tobacco advertisements to the shape of the pack, the price, and the health hazard warning. During discussions before the law was passed, a booklet describing the economic and health hazards of smoking was supplied to every member of parliament. The media provided continuous support to maintain public opinion against smoking. Problems encountered after passage of the law included (1) enforcing the no smoking rule in crowded buses and in certain public offices, largely because smoking areas were not available; and (2) circumvention by the tobacco companies of the ban on advertising in sports clubs (through car-racing sponsorship). Articles of the law are reprinted, with comments.

86-1283. Rigatto, M. **Experience in a Country Without Smoking Control.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 589-591.

Tobacco taxes represent 10 to 12 percent of the national budget in Brazil, the fourth largest tobacco producer in the world (500,000 tons/year), with a high level of cigarette consumption (140 billion/year) also. Despite such strong economic ties to tobacco, some municipal and State legislatures have passed antismoking laws (i.e., ban on smoking in public places, and antismoking health education for children); however, there has been no Federal legislation against smoking. Ministers of Health, Welfare, and Education are amenable to some regulation, but resistance is steadfast among Ministers of Economics. A suggested antismoking strategy would be to maintain pressure on all fronts, but to concentrate efforts on communities, where a growing consciousness may demand a national ban on tobacco. Antismoking groups are calling for a ban on all tobacco advertising, progressive increases in cigarette prices, and fiscal stimuli for substituting cereal crops for tobacco. In the last 2 years, the Government has made successive and significant increases in the price of cigarettes (to increase tax revenues), which has resulted in a 6 percent decline in tobacco consumption (after many years of a continuous 7 percent/year rise). This is considered a promising trend.

86-1284. Roemer, R. **Combating the Smoking Epidemic: Why Legislation.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 593-602.

Strong antismoking legislation (1) decreases cigarette consumption; (2) provides a basis for effective educational campaigns on smoking and health, particularly among young people and high-risk groups (pregnant women and workers exposed to occupational hazards); (3) protects the right of nonsmokers to breathe clear air; and (4) establishes nonsmoking as the social norm. Types of legislation include (1) control of advertising and sales promotion of cigarettes and other tobacco forms; (2) health warnings and tar and nicotine content statements; (3) control of harmful substances in tobacco; (4) restrictions on sales to adults; (5) restrictions on smoking in public places; (6) restrictions on smoking in the workplace; (7) prevention of smoking among young people; (7) mandatory health education on smoking; (8) fiscal and economic measures; and (9) multipurpose. The reasoning behind each type of legislation is discussed. A key problem in enacting and implementing legislation is the conflict between public health requirements (to what extent should a rational and scientific society provide freedom to spread harmful substances in the community) and individual rights (to what extent should an individual be allowed to engage in dangerous, self-destructive behavior that entails serious risk of deleterious personal, social, and economic consequences for others). Legislation that has been successful in helping to curb the smoking epidemic is discussed.

86-1285. Thompson, M.E.; Forbes, W.F. **Taxation as a Means of Affecting Tobacco Usage.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 495-504.

Taxation to raise revenues, to decrease tobacco consumption, and to pay for the costs of smoking is discussed. A convenient source of income, tobacco taxation is attractive for its ease of administration and political acceptability. Substantial taxation may lead to an erosion of the tax base from a reduction in number of smokers, and fewer smokers may reduce tobacco industry activities, adversely affecting the country's economy (particularly in underdeveloped countries). Smuggling may also be encouraged. Heavy tax increases may shift smokers to less heavily taxed tobacco products or force them to smoke more intensely to shorter butt lengths. Arguments that smokers pay for extra health costs through increased taxation on tobacco may be valid for developed countries, but are invalid for countries where health care systems have never been fully developed. This type of taxation may also shift the burden to the poor in western countries, who are more likely to be smokers. Reducing costs for the necessities of life and increasing costs of tobacco may shift expenditures in desirable directions. Addicted smokers, who may not be affected by increased taxation, may be motivated to attend a smoking cessation clinic through an exemption from taxation. Differential taxation is also evaluated.

LEGISLATION

86–1286. ToVadek, M.; Jamrozik, K. **Tobacco Advertising in Developing Countries—Experience in Papua, New Guinea.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 629-633.

A legislative ban on all advertising and promotion of cigarettes, tobacco, and related products in Papua New Guinea, sponsored by the Health Department, the Institute of Medical Research, and the Anti-Smoking Council, proposes to (1) create nonsmoking areas in public places; (2) establish health education programs; (3) provide clinics and counselors for cessation of smoking; (4) control tar and nicotine content of cigarettes; (5) collect current information on trends and attitudes of smokers; and (6) measure the health consequences of smoking in the community. Legislative measures would (1) regulate advertising of tobacco products; (2) prohibit cigarette packages that do not carry a health warning label and hazard symbol; (3) prohibit sale or giving of tobacco products to people under the age of 18; and (4) increase the import duty on tobacco products. It is anticipated that the proposed legislation will run into opposition from the tobacco industry and from sport and cultural groups supported by tobacco revenue.

See also, **86–1219, 86–1243, 86–1254, 86–1304, 86–1311**

86–1287. Woodward, S.D. **Campaigning for Legislation to Ban Tobacco Promotion: A Case Study.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 635-639.

Preparation, introduction, and passage of a parliamentary bill to end tobacco advertising in Western Australia is discussed. The bill, a project of the Australian Council on Smoking and Health (ACOSH), called for extending restrictions to all areas of constitutional control, including billboards, newspapers, magazines, and other publications, public transport, and areas affected by distribution of free cigarette samples. An antilegislation campaign run by the tobacco industry consisted of personal interviews with parliamentarians, interviews on radio and television talk shows, telexes and letters to parliamentarians, and newspaper advertisements. Although there was no apparent bias on television, tobacco lobbyists received a disproportionately large share of radio time. Newspapers also gave preferential treatment to the tobacco industry's point of view, in both editorial and news columns. Health lobby tactics took the form of propaganda to parliamentarians, personal interviews with parliamentarians, petitions, doctors' rally at Parliament House, press statements, and organizational support from the Australian Medical Association. The bill failed to get the required majority of votes to make it into law.

GENERAL

86–1288. Andreasson, S. **Viktigt fa Klarhet i Rokningens Konsekvenser for Sjukvardskostnaderna. [Importance of Clarifying the Consequences of Smoking for Care Costs.] (Letter).** *Lakartidningen* 82(48):4194, 1985, Swedish.

In a continuing dialog concerning the smoking-attributable illness costs in Sweden during 1980 and savings due to smoking cessation, it is reemphasized that the original research (*Lakartidningen* 82(36):2978-2987, 1985) failed to consider the health care costs for ex-smokers that result from a longer life. Care costs are dependent on age, and if smokers die prematurely they do not incur future care costs. If the 6,750 individuals who died prematurely in 1980 had lived, they would have accumulated care costs of 2,228 million kroner (kr). Also, comparison between 1 year's costs for those who died as a result of smoking and the total savings in care costs if all smokers quit forever is considered absurd. The total increase in care costs if all smokers quit would be much higher than the 8 million kr calculated, since extra care costs incurred during a longer lifetime were not considered. It is concluded that quitting smoking would increase total care costs and that the task now is to convince the public and decisionmakers to designate more resources to reduce smoking. See also 86-1289, 86-1297, 86-1298.

86–1289. Andreasson, S. **Allmant Rokstopp Dyrt for Sjukvarden! [In General Stopping Smoking Is Expensive for Health Care!] (Letter).** *Lakartidningen* 82(47):4092, 1985, Swedish.

Calculations on the expected annual health care costs that would result from a longer life due to smoking cessation are presented in response to a previous report of the economic costs of smoking (*Lakartidningen* 82(36):2978-2981, 1985). Of 102,490 years of life lost, 42,263 years can be ascribed to individuals who died after age 65. Based on an annual care cost of 27,285 kroner (kr) per person over age 65, expected costs can be calculated at 1,153 million kr. Of the 60,227 lost years ascribed to individuals who died before age 65, 35,926 years would be expected to be lived after 65 if these individuals quit smoking. That would result in 980 million kr in care costs for the group. The remaining 24,301 years of life lost before age 65 would cost 95 million kr. Combining these three groups results in an overall care cost of 2,228 kr/year, which should be compared with the 562 million kr previously attributable to smoking. It is concluded that quitting smoking would become an expensive business for health care; however, the costs are outweighed by the other beneficial effects of smoking cessation. See also 86-1297.

86–1290. Bewley, T. **Over-Reaction to Drug Dependence—A Changing Menace.** *Medico-Legal Journal* 53(Part 2):70-86, 1985.

Various ways society has responded to problems of drugs at different times are traced, beginning with the 16th century when cane tobacco was prescribed for toothache. A century later, tobacco use was considered not safe because it "shorteneth life, breedeth disease and melancholy, hurteth the mind, and was ill for the smoker's issue." Over-reaction to the new drug caused Philip III (1606) to restrict cultivation of tobacco; smokers and growers of tobacco in Japan (1610) were at risk of their lives; violators of the no smoking law in Persia were tortured and beheaded, and smokers under the rule of a Mogul emperor of Hindustan had their lips slit. King James I dealt with the tobacco problem by raising taxes 2,000 percent. Throughout history, over-reaction to drugs, e.g., legislation to keep drugs away from people, publicity on the horrors of the drug menace, overstatements on the damage done by drugs, and other heavy-handed techniques, has resulted in undesirable responses. The drug problem should not be viewed as a national problem to be solved on a national scale, but as problems that must be dealt with locally. Pursuit of the goal to stamp out illicit use of tobacco, cannabis, alcohol, marijuana, heroin, and other drugs is described.

86–1291. Brodin, O. **Rokarna Forlorar Mest! [Smokers Lose the Most!]** *Lakartidningen* 82(47):4092, 1985, Swedish.

Data in support of previous calculations of the harmful economic effects of smoking (*Lakartidningen* 82(36):2978-2981, 1985) are provided. The previously reported 6,750 deaths, 100,000 life years lost, and 23,500 work years lost in Sweden in 1980 attributable to smoking indicate that about 80,000 retirement years were also lost. This lost time would reduce state expenses by the cost of 80,000 pensions (4 billion kroner (kr) for an average annual pension of about 50,000 kr). Since many people suffer illnesses a few years before or after retirement, smokers may lose the most because paid-in pensions will not be collected. The intention is to show that smokers have more to lose economically than the cost of cigarettes and not to detract from the personal suffering attributable to smoking. See also 86-1297.

86–1292. Carter, J. **Tobacco, President Carter, and Changing Times. (Letter).** *Journal of the American Medical Association* 255(8):1015, February 1986.

In reply to correspondence regarding an earlier editorial, former President Carter agrees that times have changed, and that he and other politicians, educators, physicians, and patients should have done more about the problem of tobacco addiction. He urges efforts to make up for past mistakes.

86–1293. Charney, M.L. **Tobacco-Products Liability Lawsuits as an Anti-Smoking Strategy. (Letter).** *New England Journal of Medicine* 314(9):587, February 1986.

Although tobacco-related liability lawsuits are a public health strategy of the first magnitude in the war against smoking, physicians are loath to recommend lawsuits to patients and organized medicine and many of the national charitable health associations avoid this strategy. Personal injury litigation can drive up tobacco prices, generate negative publicity about smoking, and press the industry to stop denying causation of disease and to label products with warnings. Legislation, regulation, excise taxes, education, warning labels, and bans on TV advertising have failed to stop the public health disaster. The most promising means left is judicial redress. Failure to act aggressively makes physicians de facto collaborators with the special interests that thrive on tobacco's continued hegemony over public health. Physicians should refer victims to attorneys and should volunteer to testify as expert witnesses in lawsuits. (Auth. Abs. Mod.)

86–1294. Edwards, D.D. **Nicotine: A Drug of Choice?** *Science News* 129(3):44-45, January 18, 1986.

Scientists and smokers have long suspected that nicotine is addictive, but rigorous experimentation on the addiction theory did not begin until the late 1970s. Nicotine, by affecting brain wave function, altering mood, and serving as a biological reward that elicits certain behavior from both laboratory animals and human volunteers, meets the technical criteria of an addictive drug. Nicotine elimination rates were directly linked to the number of cigarettes smoked in a University of California study; the faster smokers metabolized nicotine, the greater the craving for more cigarettes. Smokers given ammonium chloride to increase kidney excretion of nicotine compensated by smoking 20 percent more cigarettes. Smokers of low-tar cigarettes compensate for nicotine reduction by inhaling deeper and taking bigger puffs. Craving can persist for months or even years after quitting smoking. The definition of "addiction" has become so broad that it is almost worthless in a court of law. Tobacco industry arguments in several lawsuits focus on the concept of "personal choice," as in the Santa Barbara defense summation that stated the plaintiff "smoked because he loved it. No one forced him to smoke. Nobody put a gun to his head. It was his right, as it was anyone's right."

86–1295. Goldsmith, M.F. **Dark Days Predicted as Third World Lights Up.** *Journal of the American Medical Association* 255(8):1000,1003, February 1986.

Although in the United States smoking is becoming a lower class habit, tobacco use is increasing in the poorest countries of the world (worldwide consumption increased 75 percent in the last two decades). While smoking is being portrayed as a habit of sophisticated world citizens, antismoking efforts are meeting with only limited success in industrial countries and are failing in developing countries. In only four countries (Great Britain, Norway, Zambia, and Zimbabwe) are fewer cigarettes being smoked today than in 1964. Tobacco is a worldwide public health problem, and strategies, such as informational campaigns and bans on smoking in the workplace, restaurants, and public buildings, are needed to control its use. The number of smokers in the United States has declined from 43 to 32 percent, but consumption among persons who do smoke is higher. Greece leads the world in per capita cigarette use, followed by Japan, the United States, Hungary, and Poland. No country appears to be taking action against smoking that is commensurate with its cost in lives. The passive smokers' rights movement may be the single greatest success of the informational campaign against smoking. The health professions are urged to support a time-limited subsidy for tobacco farmers to help them convert to other crops.

86–1296. Hickey, R.J. **Statistics, Smoking, and Health. (Letter).** *Journal of the American Medical Association* 255(8):1016-1017, February 1986.

The hypothesis that cigarette smoking is symptomatic of genetic deficiencies in one or more biogenic monoamine neurotransmitter hormones that are alleviated by nicotine (*Journal of the American Medical Association* 255(8):1015-1016, February 1986) is reaffirmed, noting that a hypothesis cannot be rejected simply by disapproval. However, causality (which is based on scientific evidence and not on opinion) has been confused with symptom, and inferring causality from correlation has been accepted by some biomedical investigators and some Federal and private agencies. How can it be explained that many habitual smokers survive to age 70 years and longer without developing cancer while many habitual nonsmokers have developed fatal lung disease? The recent 10-year, 115 million dollar Multiple Risk Factor Intervention Trial, which properly used random samples of populations for comparisons to avoid bias, found few authentic benefits from antismoking advice. The implication that research by persons backed by grants from the tobacco industry have dubious merit indicates bias. Must persons working under grants from the American Cancer Society, the Public Health Service, and the Department of Health and Human Services adhere to the antismoking positions of these agencies? It is essential that epidemiologic studies be conducted scientifically and not be afflicted with opinion, popularity, self-righteousness, politics, or scientific malpractice.

86–1297. Hjalte, K.; Isacsson, S.-O.; Lindgren, B., et al. **Vad Kostar Tobaksbrukets Medicinska Skadeverkningar? [What are the Costs of the Medically Harmful Effects of Smoking?]** *Lakartidningen* 82(36):2978-2981, 1985, Swedish.

Calculations of the costs of smoking-related illness and of savings due to smoking cessation in Sweden for 1980 show that the 6,750 deaths attributed to smoking resulted in 102,000 years of life or 23,500 years of work lost. Early retirement contributed another 5,500 years of work lost. The numbers translate into a loss of 2 billion kroner (kr) in productivity. Smoking also contributed to 450,000 days of hospital care at a cost of 520 million kr. Calculated care costs, number of deaths, and number of premature retirements due to smoking are tabulated for 11 diseases known to be or suspected of being caused by smoking. The three most important are ischemic heart disease, lung cancer, and chronic obstructive lung disease. The expected cost for caring for a person who develops one of these diseases is 77,000, 80,000, and 36,000 kr, respectively. Data indicate that a young male heavy smoker can reduce such costs by almost 80 percent if he quits smoking. Savings will decrease with increasing age for lung cancer and ischemic heart disease but not for obstructive lung disease. If a male heavy smoker 30 to 59 years of age quits smoking, the expected decline in productivity decreases by almost 70 percent. It is suggested that cessation programs stress the chance for a longer and healthier life with higher income for people who quit smoking.

86–1298. Hjalte, K.; Isacsson, S.-O.; Lindgren, B., et al. **Den Ekonomiska Analysen av Rokningens Skadeverkningar kan ske i Manga Former. [The Economic Analysis of the Harmful Effects of Smoking Can Occur in Many Forms.] (Letter).** *Lakartidningen* 82(47):4093, 1985, Swedish.

In response to concurrent criticisms (*Lakartidningen* 82(47):4092, 1985) of a previous investigation of the health care costs attributable to smoking in Sweden in 1980 (*Lakartidningen* 82(36):2978-2981, 1985), it is argued that the report was not intended to demonstrate total health care costs if people quit smoking or to present a complete health benefit analysis, but was intended to show how much of the health care costs for 1 year can be attributed to smoking and how much could be saved if people quit. Arguments offered in criticism did not distinguish between prevalence and incidence ideas and erroneously combined them in calculations on future care costs of longer life. In the original study, the cost figure of 562 million kroner (kr) was calculated for 1 year (1980) and cannot be compared with future costs. The question about development of the total health and sick care costs due to smoking cessation is not resolved. Other economic aspects of smoking, including change of the disease panorama after quitting, improvement of treatment possibilities, withdrawal programs, and payment of smokers' expenses deserve serious and careful analysis. See also 86-1289, 86-1297.

86–1299. Journal of the American Medical Association. **Tobacco Product Liability.** *Journal of the American Medical Association* 255(8):1034-1037, February 1986.

Tobacco product liability litigation is more active today than in the 1950s and 1960s because of new doctrines of liability and other changes in the law and increased medical awareness about tobacco-related disease. Currently, there are three kinds of smoking injury lawsuits: (1) smoking disease victim; (2) smokeless tobacco victim; and (3) victim of cigarette-caused fires. With development of the tobacco addiction theory and scientific data to support it, attorneys think they can defeat claims by cigarette companies that a plaintiff was contributorily negligent, assumed the risk of sickness or death, was adequately warned, or misused the product. Antitobacco activists believe that the innocent bystander victim of a cigarette-caused fire may be able to prevail under the defective design theory of strict tort liability. The Board of Trustees of the American Medical Association recommends that individual physicians and the medical community at large play a central role in the resolution of the tobacco controversy; that physicians serve as nonsmoking exemplars to patients and to the community and work to educate patients and the public about the hazards of smoking; and that physicians, through professional organizations, assume a leadership role in establishing a coherent national policy. Medical experts will be called upon to testify or provide consultation with respect to etiology of an individual disease. (Auth. Abs. Mod.)

86–1300. Leu, R.E.; Schaub, T. **Smoking and Health Care Costs: Plus or Minus?** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 489-493.

Lifestyle factors, particularly smoking, are frequently blamed for increases in medical costs. However, a reduction in smoking would not only decrease age-specific annual medical care utilization rates, but would also increase longevity and the health care expenditures that increase dramatically with age. In this context, the impact of smoking on medical care expenditure is marginal. Using effects of past smoking on a male Swiss 1976 population compared with a hypothetical population of nonsmokers (44,000 more males), the percentage difference amounts to below 1 percent up to age 49, roughly 1 percent at ages 50 to 54, 8.6 percent at ages 70 to 74, and 22.1 percent at age 85 and over. If nobody born over the last 100 years had ever smoked, there would have been about 8 percent more males over 60 years of age in 1976 and about 10 percent more above the age of 65. Assuming that 100 percent instead of 65 percent of smokers' excess mortality risk is attributable to smoking, 60,200 (2 percent) more males would have been alive in 1976, 11 percent more males above age 60, and 14 percent more above age 65. Medical care use and total medical care costs of the actual 1976 population, compared with the hypothetical nonsmoking population, indicate that nonsmokers had more physician visits and fewer hospital days, but that medical care expenditure was exactly equal.

86–1301. Levin, M.L. **Rejected Landmarks: The Smoke Goes On. (Letter).** *Journal of the American Medical Association* 255(8):1018, February 1986.

The history behind the often retold anecdote (*Journal of the American Medical Association* 255(8):1017-1018, February 1986) regarding efforts to persuade editors to print antismoking articles after rejection slips had been mailed includes an account of the smoking "controversy," beginning with the skepticism it first received from most of the medical profession. The Wynder and Graham article, one of two articles that were finally published, was at first given less weight on the grounds of bias (i.e., the authors were convinced and the patients knew their diagnoses). The "prospective history" method, in which smoking histories were obtained before examination and diagnosis, presumably eliminated this type of bias. The methodologies of the two articles may be considered complementary and strengthened the case. Nevertheless, the objection concerning bias stimulated massive prospective studies in England, the United States, and Canada to provide further evidence of the relationship between smoking and lung cancer and other diseases. It is a tragedy that enormous sums are spent each year promoting the continued use of a product that causes premature death.

86–1302. Lutschg, J.H. **Tobacco, President Carter, and Changing Times. (Letter).** *Journal of the American Medical Association* 255(8):1015, February 1986.

An editorial (*Journal of the American Medical Association* 254:1359-1360, September 1985) by former President Carter lamented the plight of adolescents who fall prey to the addictive powers of tobacco. How times change! While President, Carter dismissed Department of Health, Education, and Welfare Secretary Joseph Califano, one of the few Government leaders other than the Surgeon General who publicly spoke out against tobacco use and identified it as the major cause of premature death in the United States. Carter also made a mockery of the President's Council on Physical Fitness and Sports by appointing a board member of Philip Morris as chairman. Now Carter pleads for more physician input in helping the American people arrive at healthful choices, noting that the stream of misinformation needs to be neutralized, but failing to acknowledge that presidential statements sometimes contain misinformation of even greater magnitude. It seems only yesterday that President Carter observed "the tobacco industry, the tobacco farmers, the Federal Government, all citizens want to have an accurate and enlightened education program and research program to make the smoking of tobacco even more safe than it is today."

86–1303. McCormick, J.S. **Taking Money From the Devil. (Letter).** *British Medical Journal* 292(6515):270, January 25, 1986.

Legitimate concern about the ill effects of cigarette smoking is in danger of being discredited. An earlier article (*British Medical Journal* 291(6511):1743-1744, December 21, 1985) reiterated that the cost to the National Health Service (NHS) of premature tobacco-related deaths is more than 111 million British pounds, which is naive nonsense that ignores the cost of alternative modes of death. The economist's ideal, sudden unexplained death on the day of retirement from productive work, avoids both health costs and the considerable cost of pensions. As death cannot be prevented, the economic argument concerns the relative costs of alternative ways of dying. Not dying suddenly of myocardial infarction or relatively quickly from lung cancer allows the possibility of dying slowly and expensively from other cancers or from senile dementia. Smokers also make a considerable contribution to revenues through taxes on tobacco. It is pointed out that "if 1 p were added to each packet of cigarettes sold then about 50 million pounds could be raised for research." As about 100 p is added to the price of each pack of cigarettes, revenues amount to something in the order of 5,000 million pounds, or almost a third of the total NHS budget. Smoking may be bad for health; it is good for the economy. (Auth. Abs. Mod.)

86–1304. Nath, U.R. **The Experts Meet the Media.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 337-342.

Smoking continues to increase in India because no one disputes the image of smoking as being socially acceptable. As the industry seeks to expand market shares, the health of the consumer is cynically disregarded. The biggest markets are in rural areas where 70 percent of the population lives. Promotional gimmicks and giveaways penetrate the most remote areas, while standard Government food distribution networks flounder. The Government did pass the "Cigarettes Act, 1975," which bans radio and television advertising and requires health warnings on cigarette packages; however, cigarettes are often sold "by the stick." In addition, the public is becoming more knowledgeable about the health risks of smoking. With a Government reluctant to fight the powerful tobacco interests and to ban all advertising, it is proposed that (1) legislation be passed to control the nature and content of cigarette advertising, particularly depiction of people and situations glamorizing tobacco products; (2) advertising be restricted to point of sale; (3) promotional activities and other schemes be banned; (4) sponsorship of cultural and sports events be scrutinized to prevent tobacco from being associated with the good things in life; (5) antismoking messages be used to counter tobacco advertising; (6) tar and nicotine content be printed on cigarette packs; and (7) health education be increased and given a higher priority.

86–1305. Ong, T.C.; Tan, P.Y. **The Effect of Cigarette-Smoking on the 2.414 Km Run of 155 Adult Males in Singapore.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 177-182.

Performance was impaired by chronic tobacco consumption in 155 male volunteers, ranging in age from 20 to 29 years, in a 2.414 km (1.5 mile) running test used as a standard measure of aerobic fitness. Runners were classified as (1) nonsmokers, (2) smokers of <11 cigarettes/day, (3) 11 to 20 cigarettes/day, (4) 21 to 30 cigarettes/day, and (5) >30 cigarettes/day. In general, smokers performed poorly compared with nonsmokers ($p<0.001$). Nonsmokers had the shortest running time and running time increased with number of cigarettes smoked. Shorter duration smokers had better running times than longer duration smokers ($p<0.001$). The difference in max VO_2 among men who had smoked for less than 5 years and those who had smoked for 5 to 9 years was statistically significant ($p<0.001$). Nonsmokers were also significantly older than smokers ($p<0.001$).

86–1306. Rosso, C.A.; Palombi, L. **Grazie non Fumo. [Thanks for Not Smoking.].** Turin, ERI/Edizioni Rai Radiotelevisione Italiana, 1984, 85 pp., Italian.

The 20th volume in an education series published by Rai Italian Television discusses various aspects of smoking and tobacco addiction. Cigarette smoke is composed of 254 compounds known to be toxic to the respiratory tract, including various acids, aldehydes, aliphatic and aromatic hydrocarbons, and phenolic compounds (many of which are reputed carcinogens). Although cigarette filters have helped reduce inhalation of such compounds, many researchers fear the consequences of passive inhalation of unfiltered smoke by nonsmokers. Cigarette smoke also contains gaseous toxicants, including carbon monoxide, various cyanide components, and radioactive isotopes, which may be the result of the use of fertilizers in tobacco cultivation. Nicotine, a nervous system stimulant, can produce adverse effects on many organ systems. The contribution of smoking to occupational diseases and the influence of maternal smoking on fetal outcome are also discussed. Various methods for quitting smoking are reviewed, including hypnosis, acupuncture, nicotine chewing gum, and group therapy. Smoking, a worldwide health problem of economic and environmental significance, has been the focus of numerous antismoking campaigns and legislation restricting smoking in public areas, defining cigarette formulations, and creating mandatory health warnings. Such activities threaten tobacco industries and create a need for economic incentives to encourage shifts in agricultural activities of tobacco-based economies.

86–1307. Royal College of Physicians. **Health or Smoking? Follow-up Report of the Royal College of Physicians.** London, Pitman Publishing Ltd., 1983, 141 pp.

This report by the Royal College of Physicians on the health effects of smoking focuses attention on the advances in understanding that have occurred since 1977, the date of the previous report. Topics discussed include (1) pharmacology and toxicology of tobacco smoke, (2) smoking and lung diseases, (3) smoking and diseases of the heart and blood vessels, (4) susceptibility to the smoking hazard, (5) children and smoking, (6) women and smoking, (7) breathing other people's smoke (passive smoking), (8) less dangerous forms of smoking, (9) smoking in developing countries, and (10) health education and legislation. Recommended actions include those that should be undertaken by smokers, nonsmokers, health care professionals, and government, and educational activities that should be utilized. It is also recommended that governmental actions include a ban on promotion of tobacco, a steady annual increase in taxes (so that the price of tobacco rises faster than the rate of inflation), and reduction in tar, nicotine, and carbon monoxide yields of cigarettes. Advice on smoking cessation is also provided.

86–1308. Shimp, D.M. **Achieving a Non-Smoking Environment: The Vital Role of Individual Actions.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 607-613.

By banding together, nonsmokers can overcome the billions of dollars spent by tobacco interests in promoting their deadly products. In the workplace, nonsmoker activism must work for changes in policy. Although legal action should be a last resort, the legal definition of tobacco smoke as a toxic substance gives every nonsmoker a mandate to action. Most employers have made adequate accommodation for nonsmokers without having to be sued. Cases now in court (*Smith* v. *Blue Cross and Blue Shield of New Jersey*; *Cooper and Cooper* v. *Hewlitt Packard*; and *Lee* v. *State of Massachusetts*) are reviewed. Handicapped persons who are nonsmokers have recourse under a number of Federal and State laws. The U.S. Rehabilitation Act of 1973 requires that "reasonable accommodation" be given persons whose physical impairment substantially limits major activities such as breathing and working. Unemployment compensation is being paid to employees who are forced to quit because management refuses to restrict smoking or provide accommodation. The nonsmoker becomes an activist by reminding others of the health threat posed by smoke in ambient air, speaking out whenever secondhand smoke is encountered, and educating and pressuring legislators to protect nonsmokers in public places and in the workplace.

86–1309. Slade, J. **Statistics, Smoking, and Health. (Letter).** *Journal of the American Medical Association* 255(8):1015-1016, February 1986.

The genetic hypothesis that tobacco use is a manifestation of a primary hormonal deficiency that is relieved by nicotine suggests that tobacco use is genetically predetermined and that people destined to use tobacco are prone to have smaller babies and sundry illnesses. Proponents of the genetic theory characteristically have ties to the tobacco industry. Genetic speculation may be used by the defense in product liability suits that depend on data that show tobacco use is an addiction and that it causes disease. The genetic hypothesis, first proposed 26 years ago, still lacks substantial empiric support, but it may be offered in court to show that a "controversy" remains among scientists as to the nature of tobacco use and the causes of tobacco-associated illness. For those who still regard the questions of addiction and disease from tobacco unresolved, there is a simple solution: stop distribution of tobacco for one generation in one country. If, acccording to the genetic hypothesis, there is no noticeable improvement in health, use of tobacco could resume. However, if the nation's health improves, the tobacco companies must stop selling their products to the rest of the world.

86–1310. Stephens, T.; Pederson, L. **Smoking, Physical Activity and Health: Findings From the Canada Fitness Survey.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 217-223.

Preliminary findings from the 1981 Canadian Fitness Survey indicate that light smokers had better cardiorespiratory fitness than never smokers among the 21,733 Canadians studied for ≥ 10 years to investigate the relationship between smoking and fitness. The survey collected data on physical recreation, smoking, alcohol consumption, and dietary habits in 1981 to provide a statistical base for future comparisons. Smokers (heavy, 1 to 2 packs/day; light, ≤ 10 cigarettes/day; ex-smoker, >1 year abstention; and never, no history of smoking) were subjected to fitness tests for flexibility, grip strength, endurance, and cardiorespiratory step-test. In each age-sex group, heavy smokers had the poorest performance. A dose—response relationship was apparent in all smokers except light smokers. Possible explanations are that (1) light smokers may be more active than the average person, compensating for the effect of smoking on the cardiorespiratory system; (2) light smokers may weigh less than other smokers, giving them an advantage in tests that penalize for body weight; and (3) moderate smoking, similarly to moderate alcohol consumption, may provide a protective or beneficial effect on certain parameters of health, including cardiorespiratory fitness. (Auth. Abs. Mod.)

86–1311. Warner, K.E.; Ernster, V.L.; Holbrook, J.H., et al. **Public Policy on Smoking and Health: Toward a Smoke-Free Generation by the Year 2000. A Statement of a Working Group to the Subcommittee on Smoking of the American Heart Association.** *Circulation* 73(2):381A-395A, February 1986.

Four policies are recommended by the American Heart Association to facilitate transition from a smoking society to a nonsmoking society by the year 2000: (1) increase the Federal cigarette excise tax; (2) eliminate or restrict tobacco advertising and other forms of promotion; (3) assure the rights of nonsmokers to clean air through legislative means; and (4) identify mechanisms to ease and assist farmers in the transition from growing tobacco to growing other crops or into other careers. All policies address prevention of smoking and encourage cessation, the first three directly and the fourth indirecty by attending to the needs of tobacco farmers. Taxation and advertising are designed to have a substantial impact on younger members of society. It is suggested that encouraging adult smokers to quit is essential to any smoking and health initiative, but ensuring that the next generation of adults never begins is fundamental to any strategy for achieving a smoke-free society. (Auth. Abs. Mod.)

86–1312. Wilke, A.J. **Statistics, Smoking, and Health. (Letter).** *Journal of the American Medical Association* 255(8):1015, February 1986.

Like other addictions, cigarette smoking is associated with drug-seeking behavior and a well-described withdrawal syndrome. The sooner it is treated as an addiction, the sooner victims can be detoxified. An earlier report that cigarette smoking may be symptomatic of a physiologic deficiency that nicotine tends to alleviate (*Journal of the American Medical Association* 254:1311-1312, September 1985) drew a parallel between satisfying hunger by eating and ameliorating a biologic monoamine neurotransmitter shortage by smoking a cigarette. At least the analogy was not with a junkie ameliorating his lack of central nervous system opiate receptors by mainlining heroin. The Carter Center report "Closing the Gap," which appeared in the same issue (*Journal of the American Medical Association* 254:1355-1358, September 1985), notes that tobacco is the single leading cause of premature death in the U.S. population. It is this concept that needs to be addressed.

See also, **86–1225**

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INTRODUCTION

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ISSN: 0081-0363

SEPTEMBER - OCTOBER 1986
Abstracts 86-1313 - 86-1639

Smoking and Health Bulletin

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AGRICULTURE

86–1313. Ali, K.; Siraj, M.; Rashid, A., et al. **Testing of Some Tobacco Varieties for Different Morphological Characters and Chemical Composition.** *Pak Tobacco* 8(1):17-20, January 1984.

Because tobacco is an important cash crop in Pakistan that plays a vital role in the economy, five flue-cured tobacco varieties (Speight G-28, Speight G-23, N.C. 79, McNair 1040, and Coker 86) were studied at Mardan and at Peshawar for plant height, stem thickness, number of curable leaves per plant, leaf size, green leaf yield, and cured leaf yield. At Peshawar, leaf number per plant and green and cured-leaf weights were significantly different among the varieties, whereas at Mardan all varietal differences were nonsignificant. Prevailing conditions are more favorable at Marden for increase in plant height, stalk thickness, number of curable leaves/plant, and leaf area compared with those at Peshawar. There were no statistically significant variations in plant height, stalk thickness, and leaf size at either location. It is concluded that tested varieties have the same yield potential at Mardan, whereas Coker 86 had the highest and N.C. 79 had the lowest yield at Peshawar.

86–1314. Cheng, H.H.; Hanlon, J.J. **Effects of Green Peach Aphid, *Myzus Persicae* (Sulzer), on Yield and Quality of Flue-Cured Tobacco in Ontario.** *Tobacco International* 187(25):33-37, December 1985.

Field studies on effects of the green peach aphid (*Myzus persicae*, Sulzer) on yield and quality of flue-cured tobacco were conducted during 1976, 1977, and 1979 at Delhi, Ontario, Canada. Aphid distribution and density by leaf position were recorded weekly until harvest. Aphid infestations had a great effect on yield of second and third primings, little effect on the fourth priming, and no effect on first and fifth primings. Physically, aphid injury adversely changed color, odor, and texture of cured leaves, thus reducing grade, price, and lamina weight. Chemically, aphids decreased total alkaloids, reducing sugars, and sugar to alkaloid ratio and increased total nitrogen in all leaves. It is recommended that growers spray as soon as 20 percent of plants are infested. (Auth. Abs. Mod.)

86–1315. Douglass, E.A.; Mackown, C.T.; Gay, S.L., et al. **Nitrate Uptake and Assimilation in Maleic Hydrazide Treated Tobacco (*Nicotiana Tabacum* L. CV. KY 14).** *Tobacco International* 188(2):33-37, January 1986.

Maleic hydrazide (MH), a systemic growth regulator, is commonly used on tobacco to control axiliary bud growth (suckering) following removal of the apical bud and three or four of the upper leaves (topping). The apical bud of 5-week-old burley tobacco plants (*Nicotiana tabacum* L.) was removed and sucker control was achieved by applying MH or by hand suckering (HS). Five and ten days after topping (DAT), plants were exposed to a 1.5 *m* mol $^{15}NO-_3$ nutrient solution for 4 hours. The plants were harvested 20 hours later after returning to a $^{14}NO-_3$ solution. At 5 and 10 DAT, MH did not affect absorption of $^{15}NO-_3$ per unit dry weight of root, but the total amount of nitrate-^{15}N absorbed by HS plants was significantly greater owing to a larger root mass than the MH-treated plants. Although lower concentrations of nitrate, soluble reduced N, and insoluble reduced N occurred in MH-treated plants, 77 to 81 percent of the total plant N in both treatments was in the reduced form. At 5 DAT, however, 71 percent of the absorbed $^{15}NO-_3$ was reduced in HS plants, whereas only 54 percent was reduced in MH-treated plants. Accumulation of soluble reduced ^{15}N was similar for both treatments, but the percentage of absorbed ^{15}N incorporation into the insoluble reduced fraction was notably lower in MH-treated plants than in HS plants at 5 and 10 DAT. The MH treatment effects were most evident on dry weight distribution followed by a differential assimilation and partitioning of the absorbed $^{15}NO-_3$. (Auth. Abs. Mod.)

CHEMISTRY

86–1316. Bell, J.W. **Smokers Told to Look at More Than Tar and Nicotine Ratings.** *Tobacco International* 188(3):27, 30, 32-33, February 1986.

Tar and nicotine ratings, although crucial, are not sufficient for judging a smoking product, and smokers are advised to choose a brand with moderate tar and nicotine content that has lower levels of certain other smoke constituents. A concerned group in France determined levels of carbon monoxide, nitrogen oxide, acetaldehyde, cyanhydric acid, acroleine, benzene, toluene, and isoprene in the gas phase of smoke from 30 best-selling brands of cigarettes. Tar and nicotine rates, with a few exceptions, paralleled each other, while rates for the other eight substances varied tremendously and independently. In the gas stage, rates of variance were from 1 to 12 for isoprene; 1 to 15 for toluene; 1 to 20 for benzene; 1 to 24 for carbon monoxide; 1 to 25 for acetaldehyde; 1 to 27 for nitrogen oxide; 1 to 32 for acrolein; and 1 to 62 for cyanhydric acid. It is urged that ratings for the eight substances be provided on cigarette packs in addition to tar and nicotine content. Tar and nicotine in 15 brands of cigarillos measured by smoking machines showed that rates among brands varied from 2 to 5 for tar and 1 to 2 for nicotine. The report (published in a popular French magazine) was weak in details and test interpretation, but is considered important in that it urged smokers to consider more than just the tar and nicotine content when purchasing cigarettes and other tobacco products.

86–1317. Fishbein, L. **Halocarbons in Indoor Environments.** In: Fishbein, L.; O'Neill, I.K. (Editors). *Some Volatile Halogenated Hydrocarbons.* Environmental Carcinogens, Selected Methods of Analysis, Volume 7. Lyon, International Agency for Research on Cancer, WHO-IARC Publication No. 68, 1985, pp. 91-106.

An estimated 2.25 million metric tons of gaseous and inhalable particulate matter is liberated by cigarette smokers into the indoor environment each year. Tobacco smoke is the source of a broad spectrum of chemicals, from relatively simple aliphatic and aromatic derivatives to complex structures such as polycyclic aromatic hydrocarbons, some of which are carcinogenic and/or mutagenic. Although almost all constituents are far more concentrated in mainstream than in sidestream smoke, it is recognized that, given the approximately 24 to 1 disparity in burning time (i.e., sidestream smoke is produced during 96 percent of total smoking time) and the difference in combustion conditions, sidestream smoke can be enriched in many compounds. Tobacco contains traces of chlorinated pesticides, some unknown chlorinated organic compounds, and up to 3 percent of inorganic chloride, a possible source of some halogenated organic compounds detected in tobacco smoke. An estimated 20 million kg of chloromethane enters the atmosphere annually from worldwide tobacco smoking, and elevated levels of methyl chloride in indoor air may be the result of cigarette smoking. The Environmental Protection Agency suggested in 1980 that the local high concentrations of methyl chloride (at parts/million levels) found in occupational settings present the greatest risk to health known to result from exposure to this compound.

86–1318. Ivicic, N.; Tomic, L.; Simeon, Vl. **Cadmium and Lead in Cigarettes and in Smoke Condensate.** *Arhiv za Higijenu Rada i Toksikologiju* 36(2):157-164, 1985.

Analysis of cadmium and lead ingestion by smokers of three commercial brands of Yugoslav cigarettes showed that intake of hazardous heavy metals increased as the quality of the cigarette decreased. Trace metals in smoke condensate and butts of cigarettes, classifed as Extra, II, and IV (filter tip), were determined by differential pulse anodic stripping voltammetry (DPASV), believed to be unique in its application to tobacco product analysis. Cadmium amounts increased with decreasing quality of cigarette, but no regularity was seen for lead. Cadmium transfer fraction was only slightly higher in Class IV cigarettes with no filter tips than in the two brands with filter tips. It was of interest that lead transfer traces in smoke condensate were apparently not retarded by the filters. Data on butt retention showed that metal retention by the two higher quality brands (filter-tipped) was clearly higher than by the nonfiltered low quality brand.

86–1319. McNamee, J.E.; Boykin, A.; Adcock, D., et al. **A Method to Label Cigarette Smoke With ^{99m}Tc.** *Health Physics* 49(6):1189-1192, December 1985.

The method described for labeling the particulate matter of smoke from commercially obtained cigarettes with ^{99m}Technetium (^{99m}Tc) would facilitate noninvasive determination of the amount of particulate matter that enters a smoker's respiratory tract, the amount that is deposited, and the amount that is cleared. A solution of technetium heptasulfide is applied to the paper wrapper of the tobacco rod and then dried. Cigarettes from each of six domestic brands with Federal Trade Commission yields of between 1 and 15 mg tar were treated with an 0.05 mL solution of technetium heptasulfide. After drying, individual cigarettes contained from 0.15 to 1.20 mCi of ^{99m}Tc-heptasulfide. Following machine smoking of the cigarettes, filter pad analysis revealed ^{99m}Tc activity that was proportional to the amount applied to each cigarette. Furthermore, radioactivity was limited to the filter holders and pads indicating an absence of ^{99m}Tc in the gaseous phase of cigarette smoke. The coefficient of variation in applied radioactivity among cigarettes labeled on the same day was less than 2 percent.

86–1320. Nielsen, M.T.; Collins, G.B. **Genotypic and Environmental Influences on Smoke Components and Leaf Chemical Constituents in Burley Tobacco.** *Tobacco International* 187(24):37-41, November 1985.

Genotypic and environmental influences on smoke components and chemical constitutents of tobacco leaf were evaluated as part of an effort to genetically alter smoke condensate concentration in burley tobacco (*Nicotiana tabacum* L.). To identify a rapid, accurate screening method, several leaf sampling techniques were evaluated and the particulate matter index (PMI) procedure was compared with cigarette smoke analyses. Four burley tobacco cultivars (Ky 14, Ky 15, Ky 41A, and Burley 21) grown for 2 years at two Kentucky locations provided leaf material. Cigarettes manufactured from cured leaves were subjected to smoke analyses. The PMI procedure estimated smoke condensate levels in cured leaf samples and two different noncured samples taken at harvest. Cured and noncured samples of tobacco grown during the dry, hot 1983 season had greatly elevated smoke condensate, nicotine, and total alkaloid levels. Other cigarette parameters such as burntime and filling value were also greater for tobacco grown in 1983. Genotypic differences were mostly nonsignificant for all measured smoke and leaf components. Lack of significant geneotype X environment interactions may have been a reflection of negligible genetic variability. Comparisons of the PMI determinations with cigarette smoke analyses suggested that cured leaf samples must be used for PMI estimation. Total alkaloid concentrations in cured leaves were highly correlated with PMI estimates. It was also suggested that smoke evaluation of advanced breeding lines of burley tobacco should be based on results of cigarette analyses. Results suggest that genetic variation for tar and for high nicotine must be introduced into burley tobacco before substantial progress can be made in breeding for low tar delivery or low tar to nicotine ratios. (Auth. Abs. Mod.)

86–1321. Tomkins, B.A.; Jenkins, R.A.; Griest, W.H., et al. **Liquid Chromatographic Determination of Benzo(*a*)pyrene in Total Particulate Matter of Cigarette Smoke.** *Journal of the Association of Official Analytical Chemists* 68(5):935-940, September-October 1985.

A method is described for determination of benzo(*a*)pyrene (BaP) delivery of reference and commercially available cigarettes and reference and placebo marijuana cigarettes, using a sequential liquid chromatographic/liquid chromatographic procedure. Total particulate matter of sample cigarette smoke, collected using a Cambridge filter pad, is ultrasonically extracted with acetone. The resulting extract is filtered and fractionated using semipreparative scale normal phase liquid chromatography (LC). Quantitative determination is achieved using analytical scale reverse phase LC equipped with a fluorescence detector. The method is precise (±10 to 15 percent relative standard deviation) and yields 85 percent or better BaP recovery at the ng/cigarette level. A single pad can be analyzed in 8 person-hours; a more typical lot of 12 pads (6 pads each for two cigarette brands) may be analyzed in 10 person-days. (Auth. Abs. Mod.)

86–1322. Werner, H.; Fridkin, M.; Aviv, D., et al. **Immunoreactive and Bioactive Somatostatin-Like Material Is Present in Tobacco (*Nicotiana tabacum*).** *Peptides* 6(5):797-802, September-October 1985.

Comparative chromatographic and immunological characterization of somatostatin (SS)-like material isolated from tobacco plant extracts, along with synthetic (hypothalamic-like) SS-14 and SS-28, indicates that both molecular forms are present in the plant. Addition of increasing concentrations of tobacco immunoreactive SS to cultured rat anterior pituitary cells resulted in a dose-dependent inhibitory effect on prostaglandin-induced release of growth hormone, an effect that was parallel to that obtained with synthetic SS-14 added to the cultures. At a concentration of 1.8 x 10^{-10}mol of tobacco SS, there was complete inhibition of the release of growth hormone induced by 10^{-6}mol prostaglandin E_2. Increasing concentrations of synthetic or tobacco SS did not modify the release of luteinizing hormone from the pituitary cell cultures. Findings raise questions concerning the evolutionary mechanisms responsible for the presence of SS in tobacco plants and the physiological significance of the observed phenomena.

PHARMACOLOGY AND TOXICOLOGY

86–1323. Austin, A.C.; Claxton, L.D.; Lewtas, J. **Mutagenicity of the Fractionated Organic Emissions From Diesel, Cigarette Smoke Condensate, Coke Oven, and Roofing Tar in the Ames Assay.** *Environmental Mutagenesis* 7(4):471-487, 1985.

Mobile and stationary combustion sources emit particle-bound organics that after extraction are mutagenic to *Salmonella typhimurium*. Organic emissions from cigarette smoke condensate (CSC), diesel fuel, coke ovens, and roofing tar were fractionated and compared for mutagenicity in the Ames assay. Major differences in distribution of mutagenicity among the four emission sources were demonstrated. Within each source, the relative mutagenicity of each fraction was significantly different in the presence and absence of exogenous metabolic activation. In the CSC sample, the polar cyclohexane insoluble fraction contained the greatest percent of total mass (74 percent) and contributed 25 percent of mutagenic activity in presence of S9. The organic base fraction accounted for the majority of mutagenic activity in presence of S9 (66 percent). Mutagenic activity (0.1 to 6 percent) was distributed across all fractions in presence of S9, except for the polar neutral fraction, which was not mutagenic. Direct-acting mutagens appeared to be present only in the polynuclear aromatic hydrocarbon 3 and 4 fractions. The CSC NEAT sample was negative, and even after fractionation, showed very little mutagenicity in absence of S9. (Auth. Abs. Mod.)

86–1324. Autrup, H.; Seremet, T.; Arenholt, D., et al. **Metabolism of Benzo(*a*)pyrene by Cultured Rat and Human Buccal Mucosa Cells.** *Carcinogenesis* 6(12):1761-1765, 1985.

Primary cultures of epithelial and fibroblast cells from human oral mucosa metabolized benzo(*a*)pyrene (BaP) into its ultimate carcinogenic form at a rate similar to or higher than other potential target tissues for BaP-induced carcinogenesis. High-pressure liquid chromatographic analysis of organosoluble metabolites isolated from tissue culture medium after 18-hour incubation with BaP showed formation of tetrols, diols, and phenols. Epithelial cells had a much higher rate of biotransformation of BaP as measured by binding to cellular DNA. Mean binding level to human buccal mucosal DNA was among the highest observed in stratified human epithelia. The major BaP—DNA adduct was formed by reaction of the bay region BaP diolepoxide with the exocyclic 2-amino group in guanine. BaP phenols and BaP 9,10-diol were the major metabolites produced by primary epithelial and fibroblast cells derived from root buccal mucosa. BaP—DNA binding levels were identical in the two cell types and several times lower than in human epithelial cells. When an established rat tongue epithelial cell line (RTE 2) was treated with BaP and 7,12-dimethylbenz(*a*)-anthracene, a slight toxic effect was observed. (Auth. Abs. Mod.)

86–1325. Bigatti, P.; Lamberti, L.; Ardito, G., et al. **Chromosome Aberrations and Sister Chromatid Exchanges in Occupationally Exposed Workers.** *La Medicina del Lavoro* 76(4):334-339, July-August 1985.

Twenty-nine hospital workers exposed to nitrous oxide and enflurane anesthetic gases and diagnostic x rays were examined for sister chromatid exchanges (SCE) and chromosome aberrations (CA) and compared with 10 nonexposed hospital workers. Of 14 smokers, 8 were in the x ray-exposed group, 2 among operating room personnel, and 4 in the control group. Of 22 women, 4 used oral contraceptives. SCE frequency was not increased in workers exposed to anesthetic gases or ionizing radiation. However, CA were significantly increased in both groups. Analysis of smoking habits in the total sample showed no differences between smokers and nonsmokers in frequency of SCE or percentage of CA. Results indicate the importance of carrying out analyses of both SCE and CA in monitoring exposed subjects. (Auth. Abs. Mod.)

86–1326. Castonguay, A.; Tjalve, H.; Trushin, N., et al. **Metabolism and Tissue Distribution of Tobacco-Specific N-Nitrosamines in the Marmoset Monkey (*Callithrix jacchus*).** *Carcinogenesis* 6(11):1543-1550, 1985.

Metabolism and tissue distribution of tobacco-specific N-nitrosamines were studied in three male marmoset monkeys 4 hours following intravenous injection with either (2′-^{14}C) *N*′-nitrosonornicotine (NNN, 20.3 µmol/kg body weight) or (carbonyl-^{14}C)4 -methylnitrosamino)-1 -(3-pyridyl)-1 -butanone (NNK, 18.8 or 420 µmol/kg body weight). Postmortem autoradiograms showed a high level of radioactivity in the liver, nasal mucosa, kidneys, melanin of the eyes, skin hair follicles, and ceruminous ear glands of the monkeys. Total radioactivity was 5.7 times higher in the liver of the low-dose NNK-injected monkey than in that of the NNN-injected monkey. Level of bound metabolites was 1.5 times higher in the nasal mucosa than in the liver of the NNN monkey. Levels were similar in the livers of NNN- and NNK-treated monkeys. DNA methylation was observed in the liver and nasal mucosa of the monkey injected with a high dosage of NNK. Reduction of the carbonyl of NNK yields 4-(methylnitrosamino)-1-(3-pyridyl)butan-1-ol(NNAl), which was present in all tissues analyzed. It was the major radioactive component in the eye and stomach lumen, and was excreted in the urine. Results indicate that, in this species of marmoset monkey, (1) liver and nasal mucosa can activate NNN and NNK to alkylating species, and (2) NNN, NNK, and NNAl are metabolized by α-carbon hydroxylation. (Auth. Abs. Mod.)

86–1327. Chularojanamontri, V.; Kewsiri, D.; Chuapasert, S., et al. **Effects of Cigarette Smoking and Alcohol Consumption on Blood Lipid Variables.** *Journal of the Medical Association of Thailand* 68(10):503-507, October 1985.

Cigarette smoking and alcohol consumption increase production of serum triglycerides, thereby elevating the risk for developing ischemic heart disease (IHD). Effects on various blood lipid variables were evaluated statistically from blood samples and from questionnaires completed by 501 (123 men) government bank clerks in Thailand. Only 1.6 percent were heavy smokers and 2 percent were heavy drinkers; 86.7 percent were nonsmokers and 51.6 percent were nondrinkers. Data showed a statistically significant increase in concentration of serum triglycerides with number of cigarettes smoked and with amount of alcohol consumed ($p = 0.001$), but not with serum cholesterol and high density lipoprotein cholesterol (HDL-C). Serum triglycerides showed a statistically significant inverse correlation with HDL-C concentration and positive correlation with serum cholesterol ($p = 0.001$). A weak negative correlation was shown between HDL-C and serum cholesterol concentration ($p = 0.049$). A prospective study of this population is recommended to confirm the findings.

86–1328. Clarke, P.B.S.; Pert, A. **Autoradiographic Evidence for Nicotine Receptors on Nigrostriatal and Mesolimbic Dopaminergic Neurons.** *Brain Research* 348(2):355-358, December 1985.

Experimental results suggest that nicotinic cholinoceptors are located on nigrostriatal and mesolimbic dopaminergic neurons at the level of perikarya and terminals in the substantia nigra pars compacta. Male Sprague-Dawley rats received unilateral injections of 6-hydroxydopamine into the medial forebrain bundle, resulting in an ipsilateral loss of striatal dopamine and of dopaminergic perikarya. Nicotine receptor autoradiography was performed by incubating coronal sections in buffer containing 3.5 nmols of (^{3}H)nicotine, followed by rinsing, drying, and assessment of nondisplaceable labeling by the addition of excess nonradioactive L-nicotine bitartrate. A concomitant reduction of displaceable tritiated nicotine binding was observed autoradiographically in the ipsilateral substantia nigra, ventral tegmental area, striatum, nucleus accumbens, and olfactory tubercle. Results, combined with evidence from electrophysiology and biochemical studies, suggest that the nigrostriatal and mesolimbic dopaminergic systems are activated by nicotine and acetylcholine acting at the level of cell bodies and terminals.

86–1329. Connelly, J.C.; Skidgel, R.A.; Schulz, W.W., et al. **Neutral Endopeptidase 24.11 in Human Neutrophils: Cleavage of Chemotactic Peptide.** *Proceedings of the National Academy of Sciences of the United States of America* 82(24):8737-8741, December 1985.

Analysis for the presence of membrane metallo-endopeptidase (NEP; neutral endopeptidase, kidney-brush-border neutral proteinase, enkephalinase, EC 3.4.24.11) in human neutrophils revealed that intact neutrophils from donors who smoked had NEP activities about twice that of nonsmokers. Average NEP activity in seven smokers was 17.3±0.9 nmol/hr/10^6 cells compared with an average of 9.5±0.9 nmol/hr/10^6 cells in six nonsmokers. NEP activity was determined by the rate at which the substrate glutaryl(Glut)-Ala-Ala-Phe-(4-methoxy-naphthylamine) (Glut-Ala-Ala-Phe-MNA) was cleaved by neutrophils. Subcellular fractionation and sucrose density gradient centrifugation of lysed neutrophils showed that most of the NEP activity was membrane bound. A washed membrane fraction from human neutrophils rapidly cleared 0.5 nmol/Glut-Ala-Ala-Phe-MNA (96 nmol/min/mg), 0.1 nmol bradykinin (34 nmol/min/mg), and 0.1 nmol fMet-Leu-Phe (49 nmol/min/mg). Hydrolysis of Glut-Ala-Ala-Phe-MNA was inhibited by 1 μmol phosphoramidon and by specific antiserum to human renal NEP. Overall results indicated that NEP in neutrophils may have important functions in inflammatory and chemotactic processes. The observed effect of smoking requires further investigation in a larger population. (Auth. Abs. Mod.)

86–1330. Denizeau, F.; Marion, M.; Chevalier, G., et al. **Genotoxicity of Dimethylnitrosamine in the Presence of Chrysotile Asbestos UICC B and Xonotlite.** *Carcinogenesis* 6(12):1815-1817, 1985.

Chrysotile asbestos and xonotlite fibers did not display significant binding capacity, and tests showed no apparent interaction of chrysotile with dimethylnitrosamine (DMN) when xonotlite (a fibrous calcium silicate used to replace asbestos in various industrial applications) and chrysotile asbestos were studied for possible interactions with DMN, a genotoxic component of tobacco smoke. Interactions of particulates with chemical genotoxic agents may play an important role in the induction of carcinogenesis, e.g., synergism associated with combined exposure to asbestos and tobacco smoke in the case of bronchogenic cancer. The study focused on the capacity of fibers to interfere with genotoxic response elicited by DMN in the UDS/hepatocyte assay system specifically designed for sensitive detection of short-patch DNA repair. The properties of the selected fibers with respect to binding affinity toward DMN were also examined. Xonotlite also did not exhibit genotoxic properties per se nor did it interfere with the UDS response produced by DMN, a short-patch DNA repair-inducing compound. However, in similar experiments with 2-AAF, an agent known to cause long-patch DNA repair, the presence of xonotlite resulted in lower (^{3}H)-thymidine incorporation in the UDS assay, whereas chrysotile had no effect. (Auth. Abs. Mod.)

86–1331. Fera, T.; Abboud, R.T.; Richter, A., et al. **Acute Effect of Smoking on Elastaselike Esterase Activity and Immunologic Neutrophil Elastase Levels in Bronchoalveolar Lavage Fluid.** *American Review of Respiratory Disease* 133(4):568-573, April 1986.

Bronchoalveolar lavage (BAL) obtained from 30 smokers before smoking after 8 hours of abstinence, and 2 minutes to 1 hour after smoking either two or four cigarettes, was concentrated and assayed for elastolytic activity. No activity against insoluble ^{3}H-elastin was detected using an assay capable of detecting subnanogram quantities of elastase. Total elastaselike activity in BAL against succinyl-trialanyl-*p*-nitroanilide (SLAPN) was significantly increased ($p<0.02$) in smokers prior to smoking (47.4±20.2 ng human neutrophil elastase (HNE) equivalents) compared with BAL from seven nonsmokers (26.3±13.4 ng HNE); however, there was no significant change in enzyme activity in smokers' BAL after smoking. Assays with ethylenediaminetetraacetic acid and phenyl-methyl-sulfonyl-fluoride as inhibitors suggested that approximately two-thirds of elastaselike activity was due to a metalloprotease and that there was negligible serine protease activity. Immunologic neutrophil elastase levels in BAL increased significantly after smoking in five smokers tested before and immediately after smoking four cigarettes (from 17.2±5.6 to 37.2±15.6 ng HNE/mg albumin, $p<0.05$), but not in the five tested before and 1 hour after smoking four cigarettes, suggesting release of neutrophil elastase in the bronchoalveolar lining immediately after smoking, followed by clearance of elastase-α_1-protease inhibitor complexes 1 hour after smoking. (Auth. Abs. Mod.)

86–1332. Golding, J.F. **Stimulant Effects of Cigarette Smoking on EEG.** *British Journal of Pharmacology* 87(Proceedings Supplement):111P, March 1986.

The overall effect of cigarette smoking on tonic (but not phasic) electroencephalography (EEG) under conditions of minimal tobacco deprivation was predominantly stimulant, suggesting that the stimulant effect of smoking cannot be entirely the result of a simple reversal of a tobacco withdrawal syndrome. Cigarette smoking effects on EEG, visual evoked potentials (VEP), and photic driving (PD) were studied in habitual smokers allowed to smoke for up to 1 hour prior to experimentation. Healthy men and women smoked either real (1.3 mg nicotine) or sham (0.0 mg nicotine) cigarettes before and after EEG recording. Smoking real cigarettes significantly increased relative power in all the beta bands, decreased alpha and theta activity, and increased dominant alpha frequency. The effects in the alpha and theta bands depended on whether eyes were open or closed. Heart rate and exhaled carbon monoxide (CO) were significantly elevated by real smoking. Correlational analysis indicated that number of prior cigarettes smoked, basal CO level, personality, and basal EEG activity level significantly predicted variation in the effect of smoking on EEG. (Auth. Abs. Mod.)

86–1333. Gupta, S.G.; Gupta, M.S.; Moga, R.L., et al. **Carboxy-Haemoglobin Levels Following Cigarette and Bidi Tobacco Smoking—A Comparative Study.** *Journal of Association of Physicians of India* 33(6):404-406, June 1985.

High carboxyhemoglobin (COHb) levels persisted for up to 45 minutes in myocardial infarction patients compared with normal subjects after smoking a cigarette or bidi tobacco, in a study of smoking effects on the cardiovascular system. Basal levels were between 1.20 percent and 4.40 percent in the coronary group and 0.34 percent and 3.10 percent in the noncoronary group ($p < 0.05$). After smoking, the coronary group had peak COHb values for 15 minutes. The rise of COHb levels after bidi or cigarette smoking was highly significant ($p < 0.001$). Increase in COHb levels following bidi smoking (121.7 percent) was significantly higher ($p < 0.001$) than after cigarette smoking (69.8 percent). COHb levels in the noncoronary group showed a significant increase ($p < 0.001$) 15 minutes following both types of smoking, with higher levels following bidi smoking (127.4 percent, $p < 0.001$) than after cigarette smoking (71.5 percent). Although COHb levels declined in both groups for 30 minutes after smoking, at 45 minutes COHb levels had almost reached basal values in the noncoronary group, but were not significantly higher in the coronary group after both bidi and cigarette smoking (34 and 32.1 percent, respectively).

86–1334. Haboubi, N.A.A.; Bignell, A.H.C.; Haboubi, N.Y. **Serum Angiotensin Converting Enzyme Activity in Cigarette Smokers.** *Clinica Chimica Acta* 154(1):69-72, January 1986.

Serum angiotensin coverting enzyme (ACE) activity was significantly lower in 40 healthy volunteers (20 men and 20 women) who smoked >15 middle tar level cigarettes/day for ≥ 10 years than in 42 healthy never smokers (22 men and 20 women). Low activity of ACE has been reported in patients with smoking-related diseases (e.g., chronic bronchitis, emphysema, and lung cancer), but not in healthy chronic smokers. Mean value of serum ACE activity for smokers was 31.1 µmol/L and 40.8 µmol/L for nonsmokers ($p < 0.001$). There was no significant difference between men and women. It is suggested that smoking either destroys endothelial cells that release ACE into pulmonary circulation or inhibits release of the enzyme. Volunteers (hospital medical, nursing, clerical, auxiliary, and laboratory staff) ranged in age from 25 to 45 years. None had a history of hypertension, diabetes, lung, or thyroid disease. Blood samples were taken from smokers at least 1 hour after smoking, and serum ACE activities were determined fluorimetrically using hippuryl-L-leucine as substrate. Results suggest that patient smoking histories be considered when assessing serum ACE levels. (Auth. Abs. Mod.)

86–1335. Hemminki, K.; Vineis, P. **Extrapolation of the Evidence on Teratogenicity of Chemicals Between Humans and Experimental Animals: Chemicals Other Than Drugs.** *Teratogenesis, Carcinogenesis, and Mutagenesis* 5(4):251-318, 1985.

A literature review of the possible association between malformations and 23 exposures (including tobacco) or occupations evaluated whether chemicals with evidence of teratogenicity in humans show similar effects in animals and whether human and animal effective doses are comparable. It (1) analyzes epidemiological findings with explicit evaluations of their reliability, and (2) pinpoints some established (or almost established) causal associations with teratogenicity in humans, which require investigation of mechanisms of action. Investigations of the possible teratogenicity of cigarette smoking are summarized, noting that the effects of maternal smoking on congenital malformations in offspring fail to show any consistent strong effect. The modest association seen between heavy smoking (>20 cigarettes/day) and central nervous system malformations may show a weak effect or confounding. The qualitative level of scientific evidence for all chemical exposures was classified into high, limited, low, and inadequate. The evidence for tobacco was low; however, only epidemiological studies regarding congenital anomaly (structural malformations and neurological defects) were considered, thus excluding birth weight alterations, abortions, still births, and behavioral effects. Individual chemicals evaluated were carbon monoxide, fluoride, halothane, hexachlorophene, LSD, lead, methylmercury, nitrous oxide, 2,4,5-T, TCDD, and vinyl chloride. In addition to tobacco, mixtures and complex exposures included anesthetic gases, coffee, ethanol, gasoline, cannabis, PCBs (Kanechlor), potato blight, smelting work, soft water, laboratory work (solvents), and spray adhesives. A number of exposures definitely or plausibly associated with human malformations were identified, and qualitative and quantitative findings were compared with observations from animal experiments.

86–1336. Herning, R.I.; Jones, R.T.; Fischman, P. **The Titration Hypothesis Revisited: Nicotine Gum Reduces Smoking Intensity.** In: Grabowski, J.; Hall, S.M. (Editors). *Pharmacological Adjuncts in Smoking Cessation.* U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse Monograph 53, DHHS Publication No. (ADM)85-1333, 1985, pp. 27-41.

Supplemental nicotine gum reduced the intensity of smoking in six smokers who consumed an average of from 30 to 40 cigarettes/day. In the two 4-hour self-paced smoking sessions, nicotine and placebo chewing gum were administered in a double-blind fashion. Parameters recorded included puff volume, puff duration, inhaled volume, inhaled duration, interpuff interval, blood nicotine levels, and cardiovascular measures. Nicotine gum reduced smoking frequency and intensity as predicted by the titration hypothesis. Precise titration (i.e., equal blood nicotine levels on both test days) was confounded by changes in nicotine delivery during smoking produced by the gum. Both placebo and active gum increased nicotine absorption during smoking. While nicotine blood levels were slightly higher on nicotine gum day, differences may not be biologically meaningful, because heart rate and blood pressure increases were similar on both days. Difficulties encountered in testing the titration hypothesis are discussed. (Auth. Abs. Mod.)

86–1337. Hughes, M.F.; Brock, W.J.; Marion, L.J., et al. **Characterization of Covalent Binding of *N'*-Nitrosonornicotine in Rat Liver Microsomes.** *Carcinogenesis* 7(1):3-8, 1986.

Data on the metabolism of the tobacco-specific carcinogen *N'*-nitrosonornicotine (NNN) to reactive intermediates that bind covalently, assessed using male Sprague-Dawley rat liver microsomes, show that cytochrome P-450 is at least in part responsible for metabolic activation of NNN, but also suggest additional mechanisms of activation. NADPH-dependent covalent binding of (^{14}C)NNN was linear with time up to 90 min and protein concentration up to 3.0 mg/mL. The apparent K_m and V_{max} of the binding were 0.91 mmol and 4.7 pmol/min/mg protein, respectively. Extensive covalent binding of (^{14}C)NNN to liver and muscle microsomal protein was also present in the absence of an NADPH-generating system and in the presence of 50 percent methanol, indicating a nonenzymatically mediated reaction. Addition of nucleophiles significantly decreased non-NADPH-dependent binding, but did not affect NADPH-dependent binding, while addition of cytochrome P-450 inhibitors significantly decreased NADPH-dependent binding by 27 to 40 percent. NADH did not replace NADPH in supporting covalent binding. Replacement of an air atmosphere with nitrogen or $CO:O_2$ (8:2) significantly decreased NADPH-dependent binding of (^{14}C)NNN by 40 and 27 percent, respectively. Aroclor 1254 pretreatment did not enhance NADPH-dependent binding. (Auth. Abs. Mod.)

86–1338. Janoff, A.; George-Nascimento, C.; Rosenberg, S. **A Genetically Engineered, Mutant Human Alpha-1-Proteinase Inhibitor Is More Resistant Than the Normal Inhibitor to Oxidative Inactivation by Chemicals, Enzymes, Cells, and Cigarette Smoke.** *American Review of Respiratory Disease* 133(3):353-356, March 1986.

Test results on a modified α_1-proteinase inhibitor (α_1-PI) indicate that the reactive center methionyl residue (Met-358) in α_1-PI is more rapidly affected by oxidants such as gas phase cigarette smoke than are other oxidizable residues in the inhibitor. However, Met-358 is not the only residue in α_1-PI whose modification can lead to inactivation of this protein's elastase inhibitory capacity. α_1-PIs containing Met-358 or valine at the reactive center were synthesized in and purified to homogeneity from recombinant yeast. The pure proteins were exposed to gas-phase cigarette smoke, N-chlorosuccinimide, mycloperoxidase plus peroxide and halide, or activated neutrophils. After brief exposures, substantial inactivation of the normal inhibitor occurred, while the mutant inhibitor remained fully active. More prolonged exposures led to complete inactivation of the normal protein and partial inactivation of the mutant inhibitor. Possible mechanisms explaining the partial susceptibility of the mutant inhibitor are discussed. (Auth. Abs. Mod.)

86–1339. Karanci, N.A. **Individual Nicotine Requirements: The Relationship Between Differences in Nicotine Intake and Physiological Response.** *Biological Psychology* 21(1):27-42, August 1985.

The relationship between different levels of nicotine intake and autonomic response was investigated in 18 smokers (men aged 19 to 33 years, who consumed 2 to 30 cigarettes/day) on a normal smoking day and after a period of deprivation. Butts of three experimental cigarettes smoked in daily life and butts of cigarettes smoked in the normal and deprived condition were collected and analyzed for nicotine retained in the filter. The amount taken into the mouth was estimated, and smokers were divided into high and low nicotine intake groups (HNI and LNI). Heart rate, skin conductance, and respiratory activity before and after smoking were recorded, and smoking typography and typology were measured. Nicotine intake of the HNI group was significantly higher than that of the LNI group in the normal condition ($p<0.05$), the deprivation condition ($p<0.001$), and in daily life ($p<0.01$). The HNI group responded to deprivation by increasing nicotine intake significantly over intake during regular daily smoking, while no changes were noted in the LNI group. Although groups differed in basal heart rate levels, both groups achieved similar levels with smoking. Groups did not differ significantly in number of years of smoking, daily consumption level, or motives for smoking, suggesting that nicotine dosage and constitutional makeup may interact in determining the physiological effects produced. (Auth. Abs. Mod.)

86–1340. Kilfeather, S.A.; Dawson, K.; De Belleroche, J., et al. **Lymphocyte β-Adrenoceptors and Multiple Prostaglandin Receptors—Effects of Ageing and Smoking.** *British Journal of Pharmacology* 87(Proceedings Supplement):113P, March 1986.

Smoking and aging effects on lymphocyte β-adrenoceptor and prostaglandin receptors and results of a preliminary investigation of lymphocyte adenylatecyclase linked prostaglandin receptors are described. β-adrenoceptor density increased with age over the range of 18 to 65 years ($p=0.001$) while maximum β-adrenoceptor response to isoprenaline decreased with age ($p=0.05$). Maximum responses to epoprostenol (PGI_2) were not related to age. β-adrenoceptor density was similar in male smokers and age-matched male nonsmokers. Maximum responses to isoprenaline and PGI_2 were reduced in smokers, but without statistical significance. In a comparison of prostaglandins PGE_2, PGD_2, and PGI_2 responses of similar magnitude were obtained from all three, but with low coefficients; 0.36, 0.36, and 0.45 respectively. EC_{50} values, which ranged between 10^{-8} and 10^{-6}mol, had the following order of potency: $PGE_2 > PGD_2 > PGI_2$. β-adrenoceptor responses to (±)isoprenaline exhibited a Hill coefficient of 0.96 and an EC_{50} of 3 x 10^{-8}mol. (Auth. Abs. Mod.)

86–1341. Kita, T.; Nakashima, T.; Kurogochi, Y. **Effects of Oral Administration of Nicotine on Circadian Rhythms of Ambulatory Activity and Drinking in Rats.** *Japanese Journal of Pharmacology* 39(4):554-557, December 1985.

Nicotine did not influence circadian patterns of rats, but did affect ambulatory activity and water intake. In male Wistar rats, 0.5, 5, and 20 mg/kg/day nicotine in drinking water induced a dose-dependent increase in ambulatory activity during the dark period. Decreased ambulatory activity had been reported previously, and it is suggested that pharmacokinetic mechanisms of nicotine may differ between oral administration and subcutaneous injection. Reduction in fluid intake at 20 mg/kg/day may have been the consequence of nicotine taste and smell. Some behavioral effects of nicotine resemble those of amphetamines, which are known to produce anorexia and adipsia through catecholaminergic alterations in the brain. It has been reported that nicotine may produce its hypophagic and hypodipsic effects through release of noradrenaline. Increase in ambulatory activity by nicotine treatment may be related to amphetamine-like effects of psychomotor facilitation. Different changes observed between ambulatory activity and drinking at doses of 5 and 20 mg/kg nicotine/day may reflect the action in different nervous systems. (Auth. Abs. Mod.)

86–1342. Krokan, H.; Grafstrom, R.C.; Sundqvist, K., et al. **Cytotoxicity, Thiol Depletion and Inhibition of O^6-Methylguanine-DNA Methyltransferase by Various Aldehydes in Cultured Human Bronchial Fibroblasts.** *Carcinogenesis* 6(12):1755-1759, 1985.

Lipid peroxidation aldehydes of the 4-hydroxy-α,β-unsaturated type, and acrolein, a tobacco smoke-related α,β-unsaturated aldehyde, were highly cytotoxic and decreased intracellular thiol content in cultured human bronchial fibroblasts after treatment with micromolar concentrations. The concentration of acrolein in cigarette smoke (30 to 80 μg/cigarette) is probably sufficient to consider it a major toxicant in smoke. Formaldehyde and acetaldehyde were less toxic: a hundred to three hundred times as much were required to affect cell survival or thiol levels. Unsaturated aldehydes also markedly inhibited DNA repair enzyme O^6-methylguanine-DNA methyltransferase known to have a cysteine residue in its active site, but had no effect on uracil-DNA glycosylase activity. Results indicate that reactive aldehydes of either exogenous or endogenous origin have direct cytotoxic effects and may induce more susceptibility in cells to other toxic chemicals owing to an impairment in cellular defense mechanisms, e.g., DNA repair and detoxification by systems requiring glutathione. (Auth. Abs. Mod.)

86–1343. Laviolette, M.; Coulombe, R.; Picard, S., et al. **Decreased Leukotriene B_4 Synthesis in Smokers' Alveolar Macrophages In Vitro.** *Journal of Clinical Investigation* 77(1):54-60, January 1986.

A comparative study of leukotriene (LT) B_4 production by alveolar macrophages (AM) and synthesis of 5-lipoxygenase products in blood polymorphonuclear leukocytes (PMNL) from smokers and nonsmokers revealed that cigarette smoking causes a profound inhibition of the 5-lipoxygenase pathway in AM but not in blood PMNL. After stimulation with 30 μmol arachidonic acid, 2 μmol ionophore A23187, or both, nonsmokers' AM produced LTB_4 and 5-hydroxy-eicosatetraenoic acid (5-HETE). When both arachidonic acid and ionophore were added, the amounts of products formed were LTB_4, 317 ± 56 pmol/10^6 cells and 5-HETE, $1{,}079 \pm 254$ pmol/10^6 cells. No metabolites were generated under control conditions. In all incubations performed, the peptido-LTs (LTC_4, LTD_4, and LTE_4) were undetectable. AM from smokers showed an 80 to 90 percent reduction of 5-HETE and LTB_4 synthesis ($p < 0.05$ to $p < 0.001$ according to stimulatory conditions). This defective lipoxygenase metabolite production in AM from smokers was observed over a wide range of stimuli concentrations and incubation times; AM from smokers also had lower levels of intracellular (esterified) 5-HETE than nonsmokers' AM. No difference in the synthesis of 5-lipoxygenase products in blood PMNL was observed between smokers and nonsmokers. (Auth. Abs. Mod.)

86–1344. Law, F.C.P.; Chakrabarti, S. **Effects of Cigarette Smoke and 3-Methylcholanthrene on the Disposition of Phencyclidine and Its *N*-Ethylamine Analogue in the Isolated Perfused Lung of Rats.** *Toxicology* 37(3/4):275-284, December 1985.

Pretreatment of rats with cigarette smoke (four cigarettes/day for 4 days) or 3-methylcholanthrene (3-MC, 30 mg/kg, intraperitoneally for 3 days) significantly enhanced phencyclidine (PCP) and *N*-ethyl-1-phencyclohexylamine (PCE) metabolism by the isolated perfused lung (IPL). With no pretreatment, the IPL removed PCP and PCE from the perfusate and converted them to free and conjugated metabolites. After 1-hour perfusion, the lung had accumulated at least 20 percent of the administered radioactivity and had metabolized more than 30 percent of the added drug. Concentration of conjugated PCE metabolite in IPL perfusate was significantly increased by both cigarette smoke and 3-MC pretreatments; concentration of conjugated PCP metabolite was unaffected by cigarette smoke exposure and increased only slightly after 3-MC pretreatment. Pretreatment with 3-MC or cigarette smoke also altered the amount of radioactivity accumulated by the lung tissue after 1-hour perfusion. Possible mechanisms for the observed metabolic activities are explored. It is concluded that a significant amount of PCP or PCE may be stored or metabolized by the lung. (Auth. Abs. Mod.)

86–1345. Lisiewicz, J.; Moszczynski, P. **Wplyw Palenia Tytoniu na Uklad Krwiotworczy i Immunologiczny Czlowieka. [Effect of Smoking on the Hemopoietic and Immune System in Man.]** *Postepy Higieny i Medycyny Doswiadczalnej* 39:383-406, 1985, Polish.

Effects of smoking on various components of the hemopoietic and immune system in man are reviewed with special regard to erythrocytes, hemoglobin, neutrophils, eosinophils, and monocytes. In addition, alterations with regard to the T and B lymphocyte system, immunoglobulins, and antibodies are discussed. Changes observed in local components of the immune system in bronchial mucosa of smokers are also presented. Increased frequency of thrombotic complications and hypercoagulability noted in smokers are reviewed with regard to platelet functions, blood coagulation factors in plasma, and the fibrinolytic system. (Auth. Abs. Mod.)

86–1346. Liu, Y.; Tai, H.-H. **Inactivation of Pulmonary NAD+-Dependent 15-Hydroxyprostaglandin Dehydrogenase by Acrolein.** *Biochemical Pharmacology* 34(24):4275-4278, December 15, 1985.

Acrolein, a highly reactive aldehyde found in cigarette smoke, induced time-dependent inactivation of NAD+-linked 15-hydroxyprostaglandin dehydrogenase from porcine lung. The inactivation process followed pseudo-first-order kinetics and was irreversible. Inactivation by acrolein was prevented by prior incubation of the enzyme with glutathione (GSH), but not by subsequent addition of GSH during the assay. Inactivation was also fully protected by prior incubation with NAD+, but only partially with prostaglandin E_1. Results suggest that acrolein alkylates the enzyme at the coenzyme binding site and inactivates the enzyme. Inactivation of pulmonary NAD+-linked 15-hydroxyprostaglandin dehydrogenase by acrolein may alter cellular and circulating thromboxane/prostacyclin ratios and subsequently disturb vascular homeostasis and augment inflammatory and anaphylactic responses in smokers. (Auth. Abs.)

86–1347. Nordberg, A.; Wahlstrom, G.; Arnelo, U., et al. **Effect of Long-Term Nicotine Treatment on (^{3}H)Nicotine Binding Sites in the Rats Brain.** *Drug and Alcohol Dependence* 16(1):9-17, September 1985.

Male rats receiving 50 mg/kg nicotine in drinking fluid for 9 or 41 weeks showed a marked reduction in fluid intake. When nicotine was withdrawn after 9 weeks, intake of water immediately increased to control level. Intake of rats following 41 weeks of exposure increased to 65 percent over control level for 14 days after withdrawal of nicotine. Tolerance to nicotine was measured after 7 days of abstinence in rats treated for 9 weeks. No significant change in cholineacetyltransferase (ChAT) activity or number of muscarinic binding sites in brain was observed after 9 or 41 weeks of treatment. Twenty-four hours after withdrawal from 41 weeks of treatment, the number of (^{3}H)nicotine binding sites in the hippocampus increased significantly, while the number of binding sites decreased in the cortex and remained unchanged in the midbrain. These changes disappeared on the 14th day of abstinence. Following 9 weeks of nicotine treatment, no change in (^{3}H)nicotine binding was observed after 24 hours or 7 days of abstinence. (Auth. Abs. Mod.)

86–1348. Reddy, C.S.; Dorn, C.R. **Municipal Sewage Sludge Application on Ohio Farms: Estimation of Cadmium Intake.** *Environmental Research* 38(2):377-388, December 1985.

In an investigation of municipal sewage sludge and smoking as sources of cadmium (Cd) exposure, the smoking-related increase in daily Cd intake was about 1 μg (not statistically significant), based on 24-hour fecal samples collected daily from 122 residents of farms treated with sludge and 103 from nontreated farms (controls). Fecal weights and daily Cd intakes were significantly lower in women than in men: 5.37 to 13.31 μg/day and 8.87 to 18.52 μg/day, respectively. There was a consistent trend for higher fecal Cd concentrations in sludge-exposed smokers and nonsmokers, but no significant increase in daily Cd intake in humans resulted from exposure to sludge on farmlands. However, cattle grazing on sludge-treated pastures consumed significantly more Cd than cattle on control pastures. It is concluded that application of sewage sludge on farmlands at rates of 2 to 10 dry metric tons/ha did not significantly contribute to daily Cd intake in humans. (Auth. Abs. Mod.)

86–1349. Reinders, J.H.; Brinkman, H.-J.M.; Van Mourik, J.A., et al. **Cigarette Smoke Impairs Endothelial Cell Prostacyclin Production.** *Arteriosclerosis* 6(1):15-23, January-February 1986.

Incubation of cultured human endothelial cells with cigarette smoke condensate (CSC) impaired basal prostacyclin release, inhibited enhanced prostacyclin release provoked by phorbol myristate acetate, and impaired thrombin-induced prostacyclin production. Production of prostacyclin from exogenous arachidonate was not affected by CSC, indicating that CSC constituents exert inhibitory properties on the level of arachidonate mobilization from cellular phospholipids rather than on cyclooxygenase or prostaglandin synthetase. CSC effects could not be attributed to nicotine or cadmium alone or in combination. CSC did not cause cell death or impairment of cell secretory function, as measured by release of von Willebrand factor. Results suggest that the CSC effects on endothelial cell prostacyclin production are reversible or that there are two endothelial cell prostacyclin-producing systems that differ in susceptibility to CSC. Since endothelial cell prostacyclin production is considered important in controlling thrombus size at sites of vascular injury, results may explain why cigarette smoking induces arteriosclerosis. (Auth. Abs. Mod.)

86–1350. Rosenberg, A. **Kronisk Kulilteforgiftning i Danmark. [Chronic Carbon Monoxide Poisoning in Denmark.]** *Ugeskrift For Laeger* 147(36):2839, September 2, 1985, Danish.

In response to a previous case report (*Ugeskrift For Laeger* 147:2538, 1985) that described carbon monoxide poisoning in a chimney sweep in Norway, it is noted that tobacco smoke inhalation is a significant cause of chronic carbon monoxide poisoning that effects all heavy smokers in the entire population. To support and illustrate this statement, carboxyhemoglobin levels were determined for nine heavy smokers and found to be between 1 and 13 percent. Individual measurements were 5, 10, 9, 9, 4.5, 13, 1, and 4 percent. Cigarette and cigar smoke contain 4 percent and 6 to 8 percent carbon monoxide, respectively.

86–1351. Russell, M.A.H.; Jarvis, M.J.; Feyerabend, C., et al. **Reduction of Tar, Nicotine and Carbon Monoxide Intake in Low Tar Smokers.** *Journal of Epidemiology and Community Health* 40(1):80-85, March 1986.

Results indicate that despite substantial compensatory increases in inhalation, smokers of low-tar cigarettes took in about 25 percent less tar, about 15 percent less nicotine, and about 10 percent less carbon monoxide than smokers of middle-tar and low- to middle-tar cigarettes. Blood nicotine, cotinine, and carboxyhemoglobin (COHb) concentrations were measured in 392 smokers (255 women and 137 men) of middle-tar (17 to 22 mg), low- to middle-tar (11 to 16 mg), and low-tar (<11 mg) cigarettes. Since tar intake cannot yet be measured directly, an index was devised to estimate tar based on the use of measured levels of an intake marker (e.g., blood nicotine) and the ratio of the tar to marker yields of the cigarettes. This approach was validated by its ability to enhance the prediction of levels of one marker by use of another. In a practical test, using COHb and the carbon monoxide to nicotine ratio of the cigarettes, mean blood nicotine concentration in smokers of low-tar cigarettes was predicted to be 31.9 ng/mL compared with the measured mean of 31.8 ng/mL. Findings indicate that low-tar cigarettes of the type available in Britain since the late 1970s are likely to prove less harmful than other brands. Monitoring of smoke intakes could supplement epidemiological approaches and provide earlier evidence of whether changing cigarette designs lead to any significant dosage reduction that could affect the risk of disease. (Auth. Abs. Mod.)

86–1352. Seyler, L.E., Jr.; Pomerleau, O.F.; Fertig, J.B., et al. **Pituitary Hormone Response to Cigarette Smoking.** *Pharmacology, Biochemistry and Behavior* 24(1):159-162, January 1986.

Findings indicate that individual differences in nausea and related hormonal responses may provide an objective method for predicting receptivity to smoking. Smoking two high-nicotine (HN) cigarettes in quick succession induced nausea in four men (mean age 36.5 years, average consumption 22.5 cigarettes/day). Plasma nicotine levels were significantly higher after smoking HN cigarettes (2.87 mg nicotine) than after smoking low-nicotine (LN) cigarettes (0.48 mg nicotine, $p<0.05$); however, mean plasma nicotine levels after smoking LN cigarettes were also significantly higher than baseline levels (8.4 ng/mL vs. 2.6 ng/mL, $p<0.01$). The hormonal response pattern for the HN condition revealed marked elevations in neurophysin I, arginine vasopressin, prolactin, adrenocorticotropic hormone, beta-endorphin/beta-lipotropin, and cortisol immunoreactivity after smoking that were significantly greater than those reached after smoking LN cigarettes ($p<0.05$). Although postsmoking growth hormone levels in the HN condition were significantly elevated over baseline ($p<0.05$), postsmoking levels were not significantly different with respect to LN and HN conditions. For thyroid-stimulating hormone, luteinizing hormone, and follicle-stimulating hormone, postsmoking immunoreactivity levels were not significantly elevated over presmoking baselines, and no statistically significant differences in either presmoking baselines or postsmoking levels between HN and LN conditions were found for neurohormones. (Auth. Abs. Mod.)

86–1353. Stavenow, L. **Stimulation of Collagen Secretion by Factors Released From Injured Arterial Smooth Muscle Cells in Culture.** *Atherosclerosis* 59(2):187-197, February 1986.

Collagen secretion stimulating activity (CSSA) of bovine arterial smooth muscle cells (SMC) was released to the culture medium after injury of cultured SMC by dimethylsulphoxide-soluble particles from cigarette smoke, but not from uninjured cells in an investigation to characterize CSSA from DSP-injured SMC and the separation of this activity from changes in total protein secretion and DNA synthesis. Total protein secretion and DNA synthesis were not stimulated in new SMC by the conditioned medium containing CSSA. The presence of protease inhibitors before assay did not influence CSSA, but this activity was completely abolished if protease inhibitors were present before injury was induced. The sensitivity to trypsin and heat suggested a protein nature of the activity. CSSA exhibited marked charge and size heterogeneity when subjected to ion exchange and gel chromatographies, and the fraction procedures revealed CSSA peaks. No CSSA peaks were seen when conditioned medium from uninjured cells was used. It is concluded that SMC injured by dimethylsulphoxide extractable material from cigarette smoke release proteins stimulating secretion of newly synthesized collagen, but not of total protein and DNA synthesis, in new SMC cultures.

86–1354. Vogel, W.; Broverman, D.M.; Klaiber, E.L. **Relation of Blood Estradiol Levels to EEG Photic Driving in Smoking vs. Non-Smoking Normal Males.** *Electroencephalography and Clinical Neurophysiology* 61(6):505-508, December 1985.

The relationship between variations in estrogen levels in smokers and nonsmokers and the frequency of electroencephalograph (EEG) "driving" responses to photic stimulation was investigated in 40 male undergraduate college students (23 smokers, 17 nonsmokers). In two EEG sessions, responses to 18 photic stimulation trials were recorded. An EEG driving response was defined as the evocation of EEG waves at the fundamental or harmonic frequency of photic stimulation for 1 full second, with no other EEG wave being visually detectable during that time. Estradiol (E_2) blood levels were divided among smokers and nonsmokers into high and low groups. For smokers, average values were 53.3 and 26.3, respectively, compared with 29.6 and 19.4 among nonsmokers. In both smokers and nonsmokers, more EEG driving responses were found in the high E_2 group than in the low E_2 group; however, the difference was significant only among smokers. Findings suggest that the effect of a gonadal steroid hormone on adrenergic functioning is an interactive result that is dependent on what other hormones act in opposition to it and the relative blood levels of the various hormones.

86–1355. Von Borstel, R.W.; Evoniuk, G.E.; Wurtman, R.J. **Adenosine Potentiates Sympathomimetic Effects of Nicotinic Agonists in Vivo.** *Journal of Pharmacology and Experimental Therapeutics* 236(2):344-349, February 1986.

Adenosine enhanced sympathomimetic responses to inhaled cigarette smoke in rats in an investigation of the pharmacological characteristics of the potentiation by adenosine of responses to nicotine to facilitate assessment of the possible physiological or clinical implications of this phenomenon. Indices of sympathetic activity examined included blood pressure, heart rate, eyelid tension, and vas deferens perfusion pressure. Elevation of arterial plasma adenosine from its basal level (approximately 1.5 μmol) to 2 to 3 μmol had no effect on the basal value of any of the indices, but increased peak responses to nicotine (40 μg/kg, i.v.). The adenosine receptor antagonist caffeine (10 mg/kg) suppressed the ability of adenosine to potentiate responses to nicotine. Pressor responses to nicotinic cholinergic receptor agonists were also potentiated by adenosine. Low doses (0.25 to 5.0 μg/kg) of synthetic adenosine receptor agonists potentiated all four sympathomimetic responses to nicotine. The nonpurinergic vasodilator sodium nitroprusside failed to potentiate responses to nicotine, suggesting that the influence of adenosine is not secondary to its direct circulatory effects. Decentralization of sympathetic ganglia that control eyelid tension and vas deferens perfusion pressure did not affect responses to nicotine or their potentiation by adenosine, confirming that the loci wherein both adenosine and nicotine act are within or distal to sympathetic ganglia. (Auth. Abs. Mod.)

86–1356. Williams, K.; Lewtas, J. **Metabolic Activation of Organic Extracts From Diesel, Coke Oven, Roofing Tar, and Cigarette Smoke Emissions in the Ames Assay.** *Environmental Mutagenesis* 7(4):489-500, 1985.

Environmental emissions samples were ranked by genotoxic potency in several bioassays. Although the relative potency of a series of automotive emissions (diesel and gasoline) in the Ames assay correlated with relative potency in mammalian cell and mouse skin, this was not the case for coke oven, roofing tar, and cigarette smoke condensate (CSC) emissions. The role of metabolic activation in determining the difference between a microbial and a mammalian bioassay in ranking the genotoxic potency of these environmental emissions is examined. Uninduced and Aroclor 1254-induced S9 from both rat and hamster liver were compared as the metabolic activator in the Ames assay with *Salmonella typhimurium* TA98. The sample of diesel emissions was direct acting, while the other samples required activation. The standard S9 concentration produced the maximum mutagenic activity. Induced S9s produced higher mutagenic activity than uninduced. Hamster S9 gave significantly higher mutagenic activity than rat S9 for CSC. Relative potency of the four samples was not significantly different between microbial (Ames), mammalian cell (mouse lymphoma), and tumor initiation (mouse skin) assays. Results suggest that differences observed between relative mutagenic activity of the emissions in mammalian cell and microbial assays were not from a lack of optimization of the S9 system but may be inherent in the different response of indicator cells to different chemical classes. (Auth. Abs. Mod.)

86–1357. Yamanaka, K.; Oshita, M.; Muramatsu, I. **Alteration of Alpha and Muscarinic Receptors in Rat Brain and Heart Following Chronic Nicotine Treatment.** *Brain Research* 348(2):241-248, December 1985.

Adrenergic and muscarinic binding sites in cerebral cortex, corpus striatum, hypothalamus/thalamus, brain stem, and heart ventricles were measured in rats treated with nicotine (6 to 8 mg/kg/day for 4 weeks) in drinking water. Nicotine treatment led to increases in specific binding of (^{3}H)prazosin and (^{3}H)clonidine in the cerebral cortex and increases in (^{3}H)prazosin binding in the hypothalamus. Changes were due to an increase of about 23 percent in B_{max}. In the brain stem and heart left ventricle, respectively, an increase and a decrease in the affinity of (^{3}H)quinuclidinyl benzilate binding were observed. There were no changes in the binding parameters of the three radioligands in other regions tested, and no alteration of (^{3}H)dihydroalprenolol binding was detected in any region examined. Results indicate that chronic nicotine administration causes an increase in the density of α_1- and α_2-binding sites in some brain regions and reciprocal changes in the affinity of muscarinic binding sites in the brain and heart. (Auth. Abs. Mod.)

See also **86–1322, 86–1539, 86–1554**

NEOPLASTIC DISEASES

86–1358. Andriulli, A.; Gindro, T.; Piantino, P., et al. **Prospective Evaluation of the Diagnostic Efficacy of CA 19-9 Assay as a Marker for Gastrointestinal Cancers.** *Digestion* 33(1):26-33, 1986.

Smoking status had no influence on levels of a new carbohydrate antigen (CA 19-9), indicating that CA 19-9 as a marker for epithelial cancers is superior to carcinoembryonic antigen (CEA) in detecting gastrointestinal malignancies, especially those arising from the pancreatic gland. Levels of CA 19-9, a monosialoganglioside identified by a monoclonal antibody raised against colorectal carcinoma cells, were compared with conventional CEA assays in sera from 97 healthy controls (blood donors), 201 patients with benign gastrointestinal disorders, and 317 patients with cancers of gastrointestinal or extragastrointestinal origin. Unlike CA 19-9, CEA levels were significantly higher in smokers than in nonsmokers. CA 19-9 was undetectable in lymphoma and myeloma patients, but was apparent in serum of some patients with extraintestinal epithelial cancers. For benign and malignant gastrointestinal diseases, CA 19-9 displayed higher sensitivity, specificity, and predictive values than CEA. CA 19-9 was elevated as frequently as CEA in patients with metastatic pancreatic cancer, but in patients with localized disease, CA 19-9 was elevated more often than CEA. In colorectal cancer, patients with and without metastases were detected at similar rates by both assays. It is anticipated that CA 19-9 assays will be capable of detecting 30 percent more gastrointestinal malignancies than are currently being identified through CEA. (Auth. Abs. Mod.)

86–1359. Bond, G.G. **Determinants of Lung Cancer Among Chemical Workers.** Doctoral Dissertation, University of Michigan, Ann Arbor, University Microfilms International 85-12366, 1985, 377 pp.

Cigarette smoking was the most important determinant of lung cancer in historical cohort mortality and nested case—control studies of 19,608 men (present and former employees of the Texas Division of Dow Chemical U.S.A.), which attempted to quantify the risk of lung cancer and to determine which exposures may have contributed to excess lung cancer risk. Lung cancer rates were excessive compared with expected levels based on rates from the United States (standard mortality ratio (SMR), 125) and Texas (SMR, 118), but not with rates for the local five-county area (SMR, 99). Data on smoking history, available for 733 workers, showed that 84.3 percent were ever smokers. Ever smokers had a significantly greater risk of lung cancer than subjects in two control series (odds ratios, 4.24 and 5.34). Additional analyses found that lung cancer risk increased with the amount smoked and duration of smoking. Findings also suggest a possible increase in risk for those who began smoking at younger ages. It is concluded that the smoking—lung cancer association observed can serve as a positive control for evaluating the effects of other exposures of interest. Significant associations were observed between lung cancer and employment in several work areas and with presumptive exposure to several chemical and physical agents encountered in those work areas. (Auth. Abs. Mod.)

86–1360. Brinton, L.A.; Schairer, C.; Stanford, J.L., et al. **Cigarette Smoking and Breast Cancer.** *American Journal of Epidemiology* 123(4):614-622, April 1986.

A case—control study of 1,547 patients and 1,930 controls in a nationwide breast cancer screening program found no evidence that smoking affected risk, nor were there any apparent relationships with more detailed exposure measures. No substantial variations in risk were noted by menopausal status, and smoking was not associated with reduced risk among naturally menopausal women. There was no evidence that smokers experience an earlier menopause than nonsmokers, even when heavy smoking was considered. However, smoking was associated with significantly elevated risk among both oral contraceptive users (relative risk, 1.6) and users of menopausal hormones (relative risk, 1.5). Evaluation of a number of sources of confounding and effect modification failed to alter the conclusion that smoking status does not appear to alter breast cancer risk. (Auth. Abs. Mod.)

86–1361. Brownson, R.C. **The Epidemiology of Lung Cancer in Metropolitan Denver.** Doctoral Dissertation, Colorado State University, Fort Collins, University Microfilms International 85-17274, 1985, 166 pp.

A dose—response relationship between lung adenocarcinoma (AC) and pack years of smoking was observed in a case—control study of 102 patients with lung AC and 121 controls with colon cancer or leukemia selected from the metropolitan area of Denver, Colorado. Passive smoke exposure remained a significant risk factor for lung AC among women after adjusting for age and smoking. No significant differences between cases and controls were noted for residential total suspended particulate (TSP) exposure and occupational, and industrial histories were not significant risk factors for lung AC. Income was inversely correlated with age- and smoking-adjusted relative risk estimates. In another study phase, lung cancer incidence by census tract was compared with corresponding values of TSP air pollution and median household income (MHI). For white men and women, MHI made a larger contribution than TSP to the variation in lung cancer rates. Squamous cell carcinoma was the predominant type among men and AC was the predominat type among women. Findings suggest the need to consider the various lung cancer cell types as different diseases. The observed relationship between passive smoking and lung cancer in women warrants further investigation. (Auth. Abs. Mod.)

86–1362. Gibberd, R.W.; Brown, K.S. **Quantitative Models of Lung Cancer Mortality for the United Kingdom, Canada and Australia.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 701-705.

Quantitative models of cancer (e.g., the relationship between lung cancer mortality and tobacco consumption) are tools for predicting future mortality rates and a means for evaluating strategies aimed at reducing lung cancer mortality. Three comparative models relating lung cancer mortality to age, sex, and cumulative tobacco consumption in Australia, Canada, and the United Kingdom are described. All models adequately described male-female differences in terms of differing consumption patterns, with the Gompertz model showing the best fit using Pearson chi-square statistics and Weibull and Brown-Forbes models generally showing lower statistical fit. The chi-squared fit can be misleading in cases of large numbers of deaths. In such cases, however, all three models produced good fits using R-squared statistics. The Brown-Forbes model was also used for cancer mortality in nonsmokers with good agreement and results, although higher rates in the United Kingdom may be attributable to other environmental factors. This model also showed relative risk increases exponentially with age and cumulative tobacco consumption. In the case of Australia, it further predicted that male cancer rates have nearly stabilized, while female rates continue to increase.

86–1363. Hakulinen, T.R.; Pukkala, E.I.; Laara, E.M. **Prediction of Lung Cancer Incidence in Finland: Appraisal of Different Approaches.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 707-720.

Several methods for making predictions for lung cancer incidence are reviewed and evaluated using data collected by the Finnish Cancer Registry. Extrapolation of trends is the easiest strategy for forecasting, but this method has failed for predictions of lung cancer in men in Finland: observed age-adjusted rates have been lower than predicted. An apparent explanation is found in changes in male smoking habits. The effect of smoking on cohort and period specific modeling is also described, noting that there are times when people tend to stop smoking more often than on average, which may be reflected in the ratios between the observed annual lung cancer incidence rates and values given by the model. A fictitious population, comparable to the entire male population with respect to smoking habits, was simulated by computer to experience selective general mortality and different lung cancer risks caused by different smoking habits and by changes in smoking. The forecasts for 2050 are lower than those for 2000. The temporary rise in the early 2000s is due to the numbers who started smoking in cohorts born in 1951 to 1960, which coincides with a temporary change to a more liberal attitude of society toward smoking. Various predictions, based on changes in smoking (initiation and cessation), are given. Lung cancer, with only one major causal factor, is well suited to a simulation model, although assumptions still must be made. Although prevention of smoking programs may be more important than trying to get people to quit, the effect on cancer incidence is likely to take several decades. In Finland, the large number of youth who started smoking in the early 1970s will cause a new rise in lung cancer incidence unless the proportion stopping is unusually large.

86–1364. Henderson, B.E.; Kolonel, L.N.; Dworsky, R., et al. **Cancer Incidence in the Islands of the Pacific.** In: *Fourth Symposium on Epidemiology and Cancer Registries in the Pacific Basin.* U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute Monograph No. 69, 1984, pp. 73-81.

In the Pacific Islands, cigarette smoking and betel nut chewing are the major preventable risk factors for cancer. Smoking rates among Polynesians in Hawaii and New Zealand are similar to and even exceed those of Europeans in the same areas. Lung cancer accounts for from 25 to 30 percent of all cancers in men and from 10 to 15 percent in women. However, the excess of lung cancer cannot be explained by smoking habits and may be the result of smoking begun at an earlier age, greater inhalation, or vitamin A deficiency. In Papua New Guinea, betel nut chewing is strongly associated with oral cancer, accounting for 20 percent of cancer in women and for 33 percent of cancer in men. It is suggested that vaccinations, early cancer detection, and control of cigarette smoking, alcohol consumption, and betel nut chewing could reduce cancer incidence among Pacific Islanders. Melanesians and Indians of Fiji registered unusually low cancer rates, particularly lung cancer in men, although more than 80 percent of Melanesian and 50 percent of Indian men are current smokers. Diet could be a factor, particularly high consumption of certain vitamins and trace elements. Data analyzed were from the South Pacific Commission Cancer Registry, which has been operating since 1977, with reasonably complete cancer incidence rates available for New Caledonia, Fiji, Micronesia, the Cook Islands, and Niue. Less complete data were available from American Samoa, Papua New Guinea, and French Polynesia. (Auth. Abs. Mod.)

86–1365. Hickey, R.J. **Risks Associated With Exposure to Radiation: Science, Pseudoscience and Opinion. (Letter).** *Health Physics* 49(5):949-952, November 1985.

People not familiar with radiation biology and epidemiology who examine the literature on low-level ionizing radiation may well become confused, since the positions of researchers are often diametrically opposite. Some have attributed the increased incidence of lung cancer among cigarette smokers to alpha particle-emitting radionuclides of radon, polonium, lead, and thoron progeny. The biophysical phenomenon of radiation hormesis, i.e., the beneficial stimulation by low levels of non-nutrient agents that are toxic or lethal at very high exposure levels, may have been overlooked by researchers in drawing this conclusion on alpha-emittors in cigarette smoke. Epidemiological evidence from studies in the United States and China has shown cancer mortality rates are lower on average in geographical areas of higher natural background radiation levels than in areas with lower radiation. Radiation-induced cancers in smokers at very low exposure levels also ignore evolutionary-biological consequences of natural selection, i.e., DNA repair mechanisms and even their evolutionary-biological necessity, according to other researchers. One study on bronchial cancer failed to include evidence on statistically significant associations of common air pollutant chemicals that may be cancer inducing.

86–1366. Hilt, B.; Langard, S.; Andersen, A., et al. **Asbestos Exposure, Smoking Habits, and Cancer Incidence Among Production and Maintenance Workers in an Electrochemical Plant.** *American Journal of Industrial Medicine* 8(6):565-577, 1985.

Lung cancer risk in 182 asbestos-exposed smokers was more than five times that of 105 other workers employed at a nitric acid production plant from 1928, followed up from 1953 to 1980. Age-adjusted lung cancer rate for asbestos-exposed smokers was 47.8/1,000 compared with 11.1/1,000 for nonexposed smokers (general population sample). In 1965, there were more smokers among the asbestos workers than in the general population sample (71.7 percent vs. 55.6 percent), fewer ex-smokers (11.9 percent vs. 21.8 percent), and fewer never smokers (16.4 percent vs. 22.6 percent). There were 42 cases of cancer observed (30.6 expected) among the workers: 17 cases of cancer of the lung and pleura combined (3.7 expected); 11 cases in heavily exposed workers (1.2 expected) and 6 in the lightly exposed workers (2.5 expected). There were also three cases of colon cancer (0.8 expected), four cases of pleural and one case of peritoneal malignant mesothelioma, three cases of malignant melanoma of the skin (0.6 expected), and seven cancers of unknown origin (1.4 expected). Mean latent period for lung cancer was 36.3 (27 to 51) years. There was no increased incidence of any cancer until 20 years after first asbestos exposure, and a statistically significant increase in the ratio of observed to expected cases for cancer of lung and pleura and cancer of unknown origin first appeared between 30 and 39 years after first asbestos exposure. The five cases of colon cancer appeared 15, 27, 30, 31, and 35 years after first exposure. Since no lung cancer cases were observed among the 33 nonsmokers, there is no definite answer as to whether the interaction between asbestos exposure and smoking with regard to lung cancer risk is additive or multiplicative. (Auth. Abs. Mod.)

86–1367. Ioannidis, P.J.; Tzavouri-Ioannidis, P. **Urbanization, Industrialization, Smoking and Lung Cancer in Europe, 1955-1974.** *Medicine and Law* 4(5):409-424, 1985.

Urbanization (UR), industrialization (IN), and total consumption of tobacco (TCT) data were assessed for relationship to age-standardized mortality from lung cancer (LCM) in European countries from 1955 to 1974 to determine possible share of each variable on both time static (ot) and time changes (dt). UR/ot and IN/ot presented a significant ($p<0.05$) positive relationship to men's LCM/ot and a nonsignificant (NS) one to women's LCM/ot. Both past (1931 to 1955) and current (1955 to 1974) TCT/ot presented a questionably positive relationship ($0.1>p>0.05$) to men's LCM/ot, but a NS relationship to LCM/ot for women. UR/ot and IN/ot presented the same significantly positive relationship to men's LCM/dt as past or current TCT/ot ($p<0.001$), but the relationship between each of these variables and women's LCM/dt was NS. Association between average TCT/dt between 1931 and 1973 to LCM/dt for each sex was NS. Past and current TCT/dt presented a negative but NS relationship to men's LCM/dt. However, women's LCM/dt presented a questionably positive relationship ($0.1>p>0.05$) to past TCT/dt and a significant inverse relationship to current TCT/dt ($p<0.01$ or <0.001). Deducting biases involved in the TCT variable regarding actual dose delivered/sex, it seems that tobacco smoking exerted an adverse effect on the increase in LCM for both European men and women between 1955 and 1974. (Auth. Abs. Mod.)

86–1368. Lee, H.P. **The Epidemiology of Lung Cancer in Singapore.** *Annals of the Academy of Medicine (Singapore)* 14(3):485-490, 1985.

Cigarette smoking is the major risk factor for lung cancer (the most frequent cancer site in Singapore), accounting for 23.4 percent (623 cases) of all cancer deaths and nearly 5 percent of deaths from all causes in 1982. Smokers are particularly vulnerable to lung cancer of the epidermoid type, the primary cause of the epidemic since 1930, with its estimated latent period of 20 to 30 years. At least 80 percent of all lung cancer deaths in men under 65 years of age are attributable to smoking. Epidemiological data indicate that (1) risk of dying from lung cancer is tenfold higher in smokers than in nonsmokers; (2) risk of developing lung cancer is directly proportional to the number of cigarettes smoked; (3) risk increases with greater exposure of bronchial mucosa to smoke (i.e., starting at an early age, inhaling smoke, increasing number of puffs/cigarette, and keeping cigarette in the mouth between puffs); and (4) risk declines with cessation of smoking, reaching the level of nonsmokers after 10 years of cessation. Men predominant (5:1) among the approximately 25 percent of adults over 15 years of age who smoke, with 40 to 49 years as peak ages. Average consumption is 16 cigarettes/day for men and 10 cigarettes/day for women. Lung cancer incidence among men averaged 330 cases/year (annual rate 30.7/100,000). Among women the average was 115 cases/year. Risks among the Chinese were more than double those of other ethnic groups.

86–1369. Lynch, C.J. **Comparisons Between the United States and Western Europe in the Health Effects of Smoking and Related Factors.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 751-756.

Data collected for 3.5 years in the United States and seven European research centers on the relationship between smoking practices and lung cancer show that the number of years as a smoker was the most significant variable in accounting for the variation of lung cancer mortality rates. In addition to years as a smoker, the other 5 (of more than 40 variables measured) that were associated with over 90 percent of the variation in lung cancer mortality ratios were (1) number of cigarettes smoked/day; (2) frequency of inhalation; (3) age at which smoking started; (4) amount of each cigarette smoked; and (5) current smoking status. Results demonstrate that there are significant differences in smoking practices reported by the various centers. The importance of such findings depends on whether differences are associated with differences in disease incidence and mortality. The low ranking of smoking status with respect to lung cancer may be the result of some respondents quitting smoking prior to diagnosis, influenced by the symptoms of disease, or since lung cancer involves a long latency period, smoking status at time of diagnosis is relatively less significant than other practices. The value of the results lies in identifying smokers at high risk of disease. If a smoker can be shown that personal smoking practices are especially hazardous, there is a better chance of encouraging that person to quit.

86–1370. Lynch, H.T.; Kimberling, W.J.; Markvicka, S.E., et al. **Genetics and Smoking-Associated Cancers. A Study of 485 Families.** *Cancer* 57(8):1640-1646, April, 1986.

Detailed family and smoking histories for 485 families indicated that increased risk of lung cancer in relatives of lung cancer patients may reflect an underlying susceptibility to malignancy in these families that is promoted by cigarette smoking. Cancer risk was evaluated in relatives of 183 men and 71 women (218 smokers, 20 nonsmokers, 16 unknown; age 62.1 ± 10.0 years) with histologically verified lung cancer and 233 patients (184 smokers) with other smoking-related cancers. Findings lacked any strong evidence for increased risk in lung cancer per se when only lung cancer in relatives was considered. Confounding factors, primarily cigarette smoking, tended to obfuscate identification of an inherited effect presenting itself exclusively as lung cancer liability. A significant increase was observed in cancers of all anatomic sites among relatives of lung cancer patients (<0.001). Most of these neoplastic lesions were not associated with smoking and were not greatly influenced by secular trends. No significant excesses of cancer at all anatomic sites in relatives of patients with other smoking-associated cancers were observed. (Auth. Abs. Mod.)

86–1371. Ohno, Y.; Aoki, K.; Obata, K., et al. **Case—Control Study of Urinary Bladder Cancer in Metropolitan Nagoya.** In: *Fourth Symposium on Epidemiology and Cancer Registries in the Pacific Basin.* U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute Monograph No. 69, 1984, pp. 229-234.

Among Japanese male smokers, the relative risk (RR) for bladder cancer in those aged 65 to 89 years was 2.37 (RR 1.87 at all ages). Age-adjusted RR for female smokers was 3.53, much higher than in men. This higher risk in women may suggest that Japanese women who smoke belong to a particular socioeconomic and cultural segment of the society that is more likely to be influenced by hazardous environments or inadequate hygienic or dietary practices. Among the 293 bladder cancer patients and 589 randomly selected controls, incidence rates were 2.42 and 7.05/100,000 for women and men, respectively. Hair dye use appeared to be a risk factor for bladder cancer in women who smoked, but after adjusting for smoking the significance of RR and the dose—response relationship disappeared, indicating no serious effect on bladder cancer development. Neither alcohol nor cola consumption was significantly associated with bladder cancer risk with or without adjustment for age and smoking. Black tea and powdered green tea may be associated with reduced risk in women, and fruit juice consumption may have a similar effect in men. Age- and smoking-adjusted RR for coffee drinking was insignificant, as was RR for use of artificial sweeteners. (Auth. Abs. Mod.)

86–1372. Peeters, P.H.M.; Verbeek, A.L.M. **Welke Kans Heeft Een 25-Jarige Roker Op Bronchuscarcinoom? [What Are the Chances of a 25-Year-Old Smoker Contracting Bronchiocarcinoma?] (Letter).** *Nederlands Tijdschrift Voor Geneeskunde* 129E(35):1694, August 31, 1985, Dutch.

Predicted mortality from bronchial cancer was based on registered cases in the Netherlands over a 20-year period. Compared with nonsmokers, anticipated mortality among men who began smoking at 16 to 25 years of age is (1) sevenfold for smokers of ≥ 10 cigarettes/day, (2) eighteenfold for smokers of ≥ 20 cigarettes/day, and (3) 54-fold for smokers of ≥ 40 cigarettes/day. Among smokers of ≥ 40 cigarettes/day, it is estimated that 207 will die of bronchiocarcinoma at 40 to 44 years of age; 563 at age 45 to 49; 1,271 at age 50 to 54; 2,512 at 55 to 59 years of age; 4,463 at age 60 to 64; and 7,229 at 65 to 69 years of age. Analysis of 1 million cancer cases registered by the Cooperative Society of Oncological Hospitals in 1978-1981, applied to 25-year-old male smokers (without segregation by amount smoked), predicted that 6 percent will die from bronchiocarcinoma by age 70 compared with 0.3 percent of nonsmokers. The method used for calculating mortality statistics is described.

86–1373. Pitot, H.C. **New Discoveries in Oncology: Potential Applications to Clinical Practice.** *Wisconsin Medical Journal* 84(12):25-27, December 1985.

Lung cancer is the major cause of cancer mortality among men in the United States, with 90 percent of cases directly related to smoking. In women, lung cancer has recently overtaken breast cancer as the leading cause of cancer mortality. Almost all recent epidemiologic studies of occupational cancer indicate that industrial processes and specific chemical products are responsible for less than 5 percent of human cancers. Substantial evidence indicates that 30 percent or more of potentially fatal cancers result from use and abuse of tobacco. Elimination of the tobacco habit within one or two decades would decrease cancer mortality by more than one-fourth and the financial burden by billions of dollars. The role of diet, viruses, and radiation as causative factors for human cancer are discussed. The natural history of neoplastic development in relation to cancer prevention and newer developments in early diagnosis and treatment of cancer are included. It is concluded that cancer ultimately can be controlled by prevention, early diagnosis, and modern treatment.

86–1374. Reed, P.I. **The Role of Nitrosamines in Cancer Formation.** *Bibliotheca Nutritio et Dieta* 37:130-138, 1986.

N-nitroso compounds, which are composed of two main groups, N-nitrosamines and N-nitrosamides, have been found to be carcinogenic in experimental animals, and 40 susceptible species have been identified. The compounds show a remarkable degree of organ specificity that varies with their chemical structures, and tumors have been induced in most organs of rodents and other animals by the administration of different N-nitroso compounds under varying experimental conditions. N-nitroso compounds may be formed in vivo when primary, secondary, and tertiary amines, amides, or guanidines react with nitrite or nitrogen oxides in the presence of such catalysts as chloride, bromide, thiocyanate, and microorganisms. Thiocyanate, which can accelerate the rate of nitrosation of secondary amines several hundredfold at acid pH, is present in saliva of smokers. However, it does not catalyze the formation of N-nitrosamides. The most convincing epidemiological evidence associating N-nitroso compounds with human cancer is the association of oral cancer with snuff-dipping in the southern United States. While several carcinogens are known to be present in smoke and chewed tobacco, N-nitrosamines are the only carcinogens to have been detected in snuff, the levels exceeding by at least two orders of magnitude those in other consumer products. It was suggested over 20 years ago that nitrogen oxides in tobacco smoke might react with nicotine to form N-nitrosonornicotine, a compound known to produce respiratory tract cancers in rodents.

86–1375. Sanfey, H.; Hamilton, S.R.; Smith, R.R.L., et al. **Carcinoma Arising in Barrett's Esophagus.** *Surgery, Gynecology, and Obstetrics* 161(6):570-574, December 1985.

Cigarette smoking and alcohol intake were associated with adenocarcinoma developing in Barrett's esophagus in 32 patients (29 men), of whom 18 were smokers at admission: 15 had smoked cigarettes for 47±35 pack years (range, 5 to 120 pack years), 3 smoked cigars, and 3 were ex-smokers who had smoked heavily prior to quitting more than 10 years prior to admission. Two patients were nonsmokers; data for nine patients were not available. Moderate to heavy alcohol consumption was reported by 18 patients, 5 did not drink alcohol, and data was unavailable for the other 9 patients. White men appear to be particularly at risk for having adenocarcinoma develop in a Barrett's esophagus. Surprisingly, only 61 percent of patients had symptoms suggestive of gastroesophageal reflux (demonstrated roentgenographically in only 41 percent). Twenty-one patients underwent esophagogastrectomy. Life table analysis revealed a survival rate of 34 percent at 2 years and 14.8 percent at 5 years. It is strongly recommended that patients avoid further exposure to tobacco and alcohol.

86–1376. Shimizu, H., Wu, A.H.; Koo, L.C., et al. **Lung Cancer in Women Living in the Pacific Basin Area.** In: *Fourth Symposium on Epidemiology and Cancer Registries in the Pacific Basin.* U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute Monograph No. 69, 1984, pp. 197-201.

Lung cancer among women was highest among whites and Hawaiians, intermediate in Chinese, and lowest among Japanese in an investigation of the disease in ethnic groups of the Pacific Basin, Shanghai, Hong Kong, Miyagi, Hawaii, and Los Angeles. The risk of lung cancer in smokers compared with nonsmokers varied from group to group as did the proportion of smokers. However, most of the interethnic differences could be explained by differences in smoking patterns. The estimated annual incidence of lung cancer among women after adjustment for smoking was 7.5/100,000 population in every ethnic group except the Chinese, where it was from 15 to 20/100,000 population. Analysis of residual rates indicates that nonsmoking Chinese women have higher incidence rates than other nonsmokers (both men and women) in the Pacific Basin, but etiologic factors specific to Chinese women have not been identified. Most residual lung cancer was adenocarcinoma of the lung. Relative risk for all histologies combined ranged from 1.3 for Chinese in Shanghai to 10.5 for Hawaiians. The risk attributable to smoking differed greatly by ethnic group: about 80 percent of lung cancer among Hawaiian women could be explained by smoking compared with only 10 percent among Chinese women in Hawaii. The relative risks for squamous cell carcinoma were generally higher than those for adenocarcinoma. The possible effect of passive smoking, diet, childhood respiratory problems, serum cholesterol, and other environmental factors is also discussed. (Auth. Abs. Mod.)

86–1377. Steenland, K.; Thun, M. **Interaction Between Tobacco Smoking and Occupational Exposures in the Causation of Lung Cancer.** *Journal of Occupational Medicine* 28(2):110-118, February 1986.

Data from a literature review of the interaction of smoking with asbestos, radon daughters, arsenic, and chloromethyl ethers showed that, with the exception of chloromethyl ethers, absolute lung cancer rates were higher for smokers than for nonsmokers, regardless of occupational exposure. The carcinogens were assessed for both additive (synergism) and multiplicative (effect modification) effects. Only nine studies were considered to have sufficient sample size and sufficient information on tobacco use and occupational exposure to evaluate interactions. Existing data were contradictory for asbestos, radon daughters, and arsenic. Inconclusive or contradictory findings are attributed to small sample size or lack of comparability of level of occupational or tobacco exposure. Findings indicated that whenever smoking did modify the effect of occupational exposure, the lung cancer rate ratio was greater for nonsmokers (compared with nonexposed nonsmokers) than smokers (compared with nonexposed smokers). (Auth. Abs. Mod.)

86–1378. Takahashi, H.; Nukiwa, T.; Matsuoka, R., et al. **Carcinoembryonic Antigen in Bronchoalveolar Lavage Fluid in Patients With Idiopathic Pulmonary Fibrosis.** *Japanese Journal of Medicine* 24(3):236-243, August 1985.

An increased incidence of lung cancer and epithelial metaplasia or hyperplasia (a precursor of cancer) was found in patients with idiopathic pulmonary fibrosis (IPF). Carcinoembryonic antigen (CEA) in bronchoalveolar lavage (BAL) fluid was measured in 31 patients with sarcoidosis, 10 with hypersensitivity pneumonitis, 16 with lung cancer, 26 with histologically confirmed IPF, and 53 controls. A high ratio of CEA to albumin was found in 25 percent of control smokers, 44 percent of nonsmokers with IPF, 62 percent of smokers with IPF, 75 percent of smokers with IPF and lung cancer, and 81 percent of patients with primary lung cancer (even though BAL was performed at noncancerous sections of the lung in cancer cases). It was confirmed that the CEA increases in BAL fluid were different from the nonspecific cross-reacting antigen detectable in normal lungs. It is suggested that an increase in the CEA/Alb ratio in BAL fluid is a possible marker of early histological disorders in the lung and of greater risk of malignant change in the clinical course of IPF. (Auth. Abs. Mod.)

86–1379. Teppo, L. **Lung Cancer in Scandinavia: Time Trends and Smoking Habits.** *World Smoking and Health* 11(1):10-15, Spring 1986.

Lung cancer incidence among Finnish men, among the highest in the world (74.4/100,000), is attributed to high cigarette consumption over a long period of time. Finns were smoking 1,500 cigarettes/year/adult in the 1920s and 1930s compared with 400 to 500/year/adult in other Scandinavian countries. Lung cancer incidence in Finland is about 50 percent higher than in Denmark and three times higher than in Norway and Sweden. Iceland has the lowest rate (16.3/100,000). Among women, rates are highest in Iceland (11.0/100,000) and Denmark (12.1/100,000). The significant decrease in the proportion of smokers among men in Finland, from 57 percent in the early 1960s to 32 percent in 1982, is probably the result of antismoking legislation enacted in 1977 that (1) prohibited advertising and sales promotion of tobacco; (2) prohibited smoking in all public places, including public transport without special provisions for smokers; (3) prohibited the sale of tobacco to persons under 16 years of age; (4) developed a health-oriented tobacco policy financed by 0.5 percent of tobacco tax revenue; and (5) fixed the limits of tar, nicotine, and carbon monoxide in tobacco products. The past differences in smoking habits between Finland and Norway may be sufficient to explain a large part of the substantial difference found in the incidence of lung cancer. From data on occupation as a risk factor for lung cancer, it is concluded that (1) data on lung cancer risk by occupation or any other parameter are of limited applicability if information on smoking is lacking; (2) smoking is the most important factor explaining occupational variations in risk; and (3) if all occupational groups reduced smoking to the level found in the academic professions, 52 percent of lung cancer cases diagnosed between 1971 and 1975 in Finland could have been prevented.

See also, **86–1395**

86–1380. Tu, J.-T.; Gao, R.-N.; Zhang, D.-H., et al. **Hepatitis B Virus and Primary Liver Cancer on Chongming Island, People's Republic of China.** In: *Fourth Symposium on Epidemiology and Cancer Registries in the Pacific Basin.* U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute Monograph No. 69, 1984, pp. 213-215.

Although smoking is an independent risk factor for primary liver cancer (PLC), further investigations are needed to determine whether smoking is also a cofactor in PLC etiology. Data on PLC risk factors, including hepatitis B virus (HBV) infection, contaminated drinking water, maize consumption, and use of tobacco and alcohol were collected from 12,222 men over 40 years of age living on Chongming Island, People's Republic of China, a high risk area for PLC. During the first 3 years of followup (1980 to 1982) there were 70 deaths. Mortality rates among heavy current smokers (≥ 20 cigarettes/day) were significantly higher than among nonsmokers in the HBV-carrier group ($p<0.05$), and increased with the number of cigarettes smoked. The difference in rates between smokers and nonsmokers who were not HBV carriers was not significant. No association was found between PLC and alcohol consumption, and results on the relationship between PLC and maize consumption were difficult to interpret. (Auth. Abs. Mod.)

NON—NEOPLASTIC RESPIRATORY DISEASES

86–1381. Adrianza, M.; Torrealba, A.; Adrianza, D. **Influencia del Habito de Fumar en la Morbilidad Respiratoria de la Poblacion Laboral Venezolana Expuesta a Riesgos de Inhalaciones Pulvigenas, Humos, Gases y Vapores del Micro Clima Industrial Manufacturado. [Influence of the Smoking Habit on the Respiratory Morbidity of the Venezuelan Labor Population Exposed to Dangerous Particulate Inhalants, Smoke, Gases, and Vapors of the Industrial Manufacturing Microclimate.]** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 1-9, Spanish.

Smoking contributed to an excess of respiratory pathology in an investigation of pneumoconiosis among 1,103 Venezuelan workers employed in cement, glassworking, and asbestos-associated industries. A group of 135 workers not exposed daily to environmental contamination served as controls. Respiratory pathology, determined by radiographic and pulmonary function analyses, was exhibited by 61 percent of workers and 37 percent of controls. Pathology was evident in 67 percent of 490 workers who smoked compared with 39 percent of 77 smoking controls, and in 54 percent of 605 nonsmoking workers and 10 percent of 58 nonsmoking controls. Differences between workers and controls in disease incidence were statistically significant for both smokers and nonsmokers, confirming the influence of hazardous atmospheric conditions on disease development. Among workers, differences in smoking behavior were significant in those aged 25 to 34 and 45 to 54 years. Analysis of organic contaminant-exposed workers alone revealed no significant difference in smoking behavior in any age group.

86–1382. Beard, K.; Jick, H., Walker, A.M. **Adverse Respiratory Events Occurring in the Recovery Room After General Anesthesia.** *Anesthesiology* 64(2):269-272, February 1986.

Adverse respiratory events in the immediate postoperative period were not substantially related to smoking habits or to amount smoked and occurred in only 44 of 2,293 patients (2.2 percent of smokers and 1.7 percent of nonsmokers). Pulmonary complications are described as (1) anaphylactoid reactions occurring in the operating room shortly after drug administration, and (2) respiratory depression and other forms of respiratory distress occurring after cessation of anesthesia. Although smokers have been shown to suffer more respiratory events during recovery than nonsmokers, only events in the immediate postoperative period were included, which may account for the absence of association with smoking. Events were related to advancing age and to male sex, but not to time of anesthesia. Events occurred more often in those receiving paralyzing drugs or fentanyl in the operating room or opiates in the recovery room. Events were also more common after thoracic or abdominal surgery (stratified relative risk 1.6).

86–1383. Begin, R.; Cantin, A.; Berthiaume, Y., et al. **Clinical Features to Stage Alveolitis in Asbestos Workers.** *American Journal of Industrial Medicine* 8(6):521-536, 1985.

To analyze the clinical features of asbestos-induced alveolitis and stage its activity, 217 asbestos workers (90 percent current or ex-smokers, average consumption 30±3 pack-years) were evaluated by clinical, radiological, and functional parameters and computerized gallium^{67} (^{67}Ga) lung scans. On the basis of recommended criteria, 106 asbestos workers were recognized as having asbestosis (group C). Of the others, 56 (group B) had rigid lung P-V curve and/or increased ^{67}Ga lung uptake and also differed from the other 55 (group A) in terms of higher asbestos exposure index, parenchymal opacity score, and higher expiratory flow rate. Lung function tests of group A showed slight obstruction, which was not unexpected in view of their smoking habits. When workers were divided into groups based on lung rale profusion scores, cigarette smoking index was higher in the group with the highest rale score ($p<0.01$). Results suggest that profusion of lung rales constitutes a simple clinical mode of assessment of disease severity that correlates better with radiological and functional parameters than with parameters of alveolitis.

86–1384. Bloom, J.W.; Halonen, M.; Dunn, A.M., et al. **Pneumococcus-Specific Immunoglobulin E in Cigarette Smokers.** *Clinical Allergy* 16(1):25-32, January 1986.

Prevalence of pneumococcus-specific immunoglobulin E (IgE) was significantly greater in smokers than in nonsmokers ($p<0.02$), suggesting that the excess is specific for microorganisms that infect the airways. Epidemiological studies have shown a relationship between elevated serum IgE levels and smoking. Allergy skin test data have suggested that the excess IgE in smokers is not specific for aeroallergens, but specific for microorganisms that often infect the lower respiratory tract of smokers. A radio-allergosorbent test assay was utilized to detect serum IgE specific for *Streptococcus pneumonaiae* (an organism commonly isolated from the respiratory tract of smokers with chronic bronchitis) in 30 smokers and nonsmokers (aged from 36 to 70 years and 40 to 80 years, respectively). Total serum IgE values were 139 to 2,496 IU/mL (geometric mean 513 IU/mL) for smokers and 102 IU/mL to

2,874 IU/mL (geometric mean 224 IUY/mL) for nonsmokers. Individual sera were considered positive for pneumococcus-specific IgE if binding was at least twice the nonspecific binding at the total IgE concentration of the particular serum. Sera from 11 of 30 smokers and 2 of 30 nonsmokers were positive for pneumococcus-specific IgE. (Auth. Abs. Mod.)

86–1385. Bridges, R.B. **Chronic Cigarette Smoking and Obstructive Pulmonary Disease.** *Giornale Italiano Delle Malattie Del Torace* 39(5):275-276, September-October 1985.

Cigarette smoke exposure effects on inflammation and inflammatory mediators and its relationship to pulmonary dysfunction was studied in 170 smokers and results were compared with those in 170 nonsmokers. Smokers, who were relatively young (mean age 35 years) with a relatively short smoking history (average 30 cigarettes/day, mean cumulative consumption 22.8 pack years), showed significant impairment of pulmonary function. There was a significant correlation between nicotine yield and total volume of smoke puffed (i.e., as nicotine yield increased, total puff volume decreased). Total puff volume/cigarette was significantly related to blood nicotine levels, suggesting that smoking behavior is intimately related to uptake of smoke constituents. Higher total peripheral blood leukocyte levels in smokers (neutrophils 44 percent, lymphocytes 31 percent, and monocytes 23 percent) correlated with impaired pulmonary function. Smoking induced a low-grade inflammatory response resulting in elevation of phase reactive proteins in peripheral blood, which was associated with both smoking history and impaired pulmonary function. Chronic cigarette smoking was associated with depressed levels of plasma vitamin C and carotenes ($p=0.05$), but the relationship between smoking and plasma concentrations is still unclear.

86–1386. Chan-Yeung, M.; Enarson, D.; Grzybowski, S. **Grain Dust and Respiratory Health.** *Canadian Medical Association Journal* 133(10):969-973, November 1985.

In a review of the respiratory effects of grain dust exposure, environmental exposure was the most important determinant of grain-dust-induced lung function decline, but there is no doubt that cigarette smoking is one of the most important predisposing host factors. However, the effects of grain dust exposure and smoking appear to be at the most additive and not synergistic. In one longitudinal study, the annual decline in lung function for grain workers (smokers) was less than the calculated combined effect of grain dust exposure and smoking. In 3-year followup of grain workers in the port of Vancouver, annual decline in lung function was greater in grain workers than in controls in each smoking category. Most prevalence studies have shown that grain workers have a higher frequency of symptoms than controls. Significantly higher prevalence of chronic cough and sputum production and lower measures of lung function have been found in nonsmokers compared with controls, indicating that grain dust can cause functional and structural changes in the lungs quite separate from those caused by smoking. Acute and chronic effects of dust exposure have been found among workers exposed to <10 mg/m^3 concentrations. Acute effects were dose related: the higher the respirable or total dust concentration the greater the acute changes in lung function. It is recommended that legal permissible grain dust levels in workplaces be decreased.

86–1387. Coates, G.; Dolovich, M.; Koehler, D., et al. **Ventilation Scanning With Technetium Labeled Aerosols. DTPA or Sulfur Colloid?** *Clinical Nuclear Medicine* 10(12):835-838, December 1985.

Lung distribution of submicronic aerosols of Tc-99m DTPA and Tc-99m sulfur colloid were compared in 83 patients (32 smokers) 20 minutes after inhalation. In 28 smokers who inhaled Tc-99m DTPA aerosol, total lung count rate fell by a mean of 27.2±14.2 percent between the 0 and 20 minute posterior image; 11 also had a major change in distribution of isotope during this time. In nonsmokers, total lung counts from Tc-99m DTPA fell by only 15.7±8.0 percent (mean) and none had a major change in distribution pattern ($p<0.005$). In Tc-99m sulfur colloid patients, no significant count rate or distribution pattern over 20 minutes was detected in either smokers or nonsmokers. Tc-99m DTPA lung clearance was more rapid among smokers, but clearance rate was not uniform throughout the lung fields; consequently, lung regions (particularly upper lobes) may not appear to be ventilated during interpretation of images as a result of aerosol absorption into the blood. Effects on ventilation images can be minimized by completing the ventilation scan as quickly as possible after Tc-99m DTPA inhalation, or by using a nondiffusable agent, such as Tc-99m sulfur colloid. (Auth. Abs. Mod.)

86–1388. Colebatch, H.J.H.; Greaves, I.A.; Ng, C.K.Y. **Pulmonary Distensibility and Ventilatory Function in Smokers.** *Bulletin Europeen de Physiopathologie Respiratoire* 21(5):439-447, September-October 1985.

Data on 101 nondisabled cigarette smokers (73 males) between 18 and 60 years of age, who smoked an average of 20 cigarettes/day, showed that pulmonary distensibility was greatly increased and increased with age at a greater rate than in nonsmokers. An increase in pulmonary distensibility has been found to precede development of emphysema. Index of distensibility, the exponent K, was derived from a single exponential function fitted to deflation static pressure-volume data. Total lung capacity (TLC) was measured with a body plethysmograph. Values for vital capacity (VC), forced expiratory volume in 1 sec (FEV$_1$), and midexpiratory flow were only slightly lower than values obtained for nonsmokers. However, smokers were unevenly affected. In relation to height, the TLC increase in male smokers was directly related to increase in K. Results show that increased distensibility may be identified in smokers without airway obstruction. Findings also suggest that cigarette smokers who subsequently develop emphysema suffer an abnormally rapid increase in the size of peripheral airspaces. An increase in airspace size reflects subtle changes in the fibrous framework of the lungs that precede the tissue breakdown recognized as emphysema. The evolution of these changes is consistent with the elastase hypothesis of the effect of cigarette smoke on lung tissue. (Auth. Abs. Mod.)

86–1389. Garcia, J.G.N.; Wolven, R.G.; Garcia, P.L., et al. **Assessment of Interlobar Variation of Bronchoalveolar Lavage Cellular Differentials in Interstitial Lung Diseases.** *American Review of Respiratory Disease* 133(3):444-449, March 1986.

Smoking was not significantly related to prevalence of interlobar variation in clinically relevant cell type found in bilobar bronchoalveolar lavage (BAL) in 34 patients: 20 with sarcoidosis, 9 with idiopathic pulmonary fibrosis—collagen vascular disease (IPF-CV), and 5 with mixed interstitial lung diseases (mixed ILD). The sarcoid group, with predominantly T-lymphocytes in 29 BAL, showed excellent interlobar correlation, with only 17 percent showing a discrepancy of >10 percent in percentage of T-lymphocytes; 4 of 15 lavages of smokers had >10 percent interlobar variation. The IPF-CV group, with predominantly neutrophils in 17 BAL, showed good interlobar correlation, but 35 percent had a >10 percent discrepancy in percentage of neutrophils; 1 of 4 lavages on smokers had >10 percent interlobar variation. The mixed ILD group, with lymphocytes as the predominant cell in seven BAL, showed poor interlobar correlation, with 42 percent showing a >10 percent discrepancy in percentage of lymphocytes; the BAL of the only smoker had >10 percent interlobar variation. Results suggest that BAL interlobar cellular differentials are reliably consistent only in sarcoidosis. (Auth. Abs. Mod.)

86–1390. Greaves, I.A.; Colebatch, H.J.H. **Observations on the Pathogenesis of Chronic Airflow Obstruction in Smokers: Implications for the Detection of "Early" Lung Disease.** *Thorax* 41(2):81-87, February 1986.

Examination of the roles of smoking-attributable large airway effects, small airway changes, and pulmonary emphysema in causing chronic airflow obstruction suggested two hypotheses for pathogenesis in smokers. The first emphasizes the parenchymal effects of smoking in producing emphysema and loss of lung elasticity. The second suggests that pathological changes in small airways are either the major sites of airflow obstruction or an important intermediate step in the pathogenesis of emphysema. Research indicates that, after allowing for cumulative smoking, pathological changes in small airways are not strongly associated with either emphysema or chronic airflow obstruction. Morphological studies have failed to show an association between small airway pathology and emphysema, suggesting that the two are determined by different host responses to a common agent or are responses to different components of cigarette smoke and, therefore, are not causally related. Since it appears that small airway pathology is of little use in predicting which smokers may progress to chronic airflow obstruction, early detection should be directed more toward tests that identify the presence of early emphysema (e.g., decreased elastic recoil, increased lung distensibility). Specific methods are explored for identifying the early stages of emphysema in smokers.

86–1391. Haagsman, H.P.; Van Golde, L.M.G. **Lung Surfactant and Pulmonary Toxicology.** *Lung* 163(5):275-303, 1985.

Data on the effects of noxious agents on quality and production of surfactant show that cigarette smoke is detrimental to the lung surfactant system. Surface tension was lowered in the expanded state, indicating a possible nonspecific effect of smoke particles when smoke was brought directly in contact with the monolayer. Compared with nonsmokers, endobronchial washings from chronic cigarette smokers showed a significant increase in minimum surface tension. A sevenfold lower yield of surfactant after endobronchial lavage has been observed in human smokers. More recently, no difference in lavage phospholipid concentration between smokers and nonsmokers was reported, but a lower phospholipid/protein ratio was found in lung lavage of smokers. Rats exposed to cigarette smoke for 20 minutes three times/day for 5 or 15 days showed a significant decrease in surfactant. Yield of pulmonary surfactant reached a minimum (50 percent of control) after 15 days of cigarette smoke inhalation. Examination of lung tissue during continuous smoke exposure for up to 20 days revealed no consistent ultrastructural alteration. However, 25-day exposure resulted in irregular expansion of alveolar spaces associated with partial or complete collapse of contiguous alveoli. Type II cells were hypertrophied with prominent cytoplasmic lamellar bodies that stained intensively osmiophilic. These enlarged cells became embedded in the distorted interstitium after treatment for 40 days, and after 50 days showed loss of lamellar bodies but retained surface microvilli characteristics of these cells. The complex effects of cigarette smoke on surfactant and surfactant-producing cells may be the result of the heterogeneous nature of smoke.

86–1392. Kew, R.R.; Ghebrehiwet, B.; Janoff, A. **The Role of Complement in Cigarette Smoke-Induced Chemotactic Activity of Lung Fluids.** *American Review of Respiratory Disease* 133(3):478-481, March 1986.

The possibility that smoke-induced chemotactic activity in lung fluids may be partly complement-dependent was investigated in male Sprague-Dawley rats to help explain increased recruitment of leukocytes to smokers' lungs. Acute inhalation exposure of rats to smoke from 2R1 Kentucky reference cigarettes caused an increase in leukocyte chemotactic activity of lung secretions collected by bronchoalveolar lavage 1 hour after exposure. Prior depletion of circulating complement prevented smoke-induced increase in lavage fluid chemotactic activity. Crossed immunoelectrophoretic analysis of lavage C3 (a heat-stable component of complement) from smoke-exposed animals demonstrated a modified form of the molecule with increased electrophoretic (anodal) mobility. When C5-deficient DBA/2 and C5-sufficient BALB/c mice were acutely exposed to cigarette smoke, only the C5-sufficient animals had increased neutrophil chemotactic activity in lung fluids 1 hour after exposure. Results indicate that increased chemotactic activity in lung fluids of laboratory animals immediately after acute cigarette smoke exposure is complement dependent. (Auth. Abs. Mod.)

86–1393. Kilburn, K.H.; Lilis, R.; Anderson, H.A., et al. **Interaction of Asbestos, Age, and Cigarette Smoking in Producing Radiographic Evidence of Diffuse Pulmonary Fibrosis.** *American Journal of Medicine* 80(3):377-381, March 1986.

Examination of 3,472 chest x rays from four populations with different levels of exposure to asbestos and with different cigarette smoking histories showed that smoking in the general population did not produce pulmonary fibrosis recognizable on chest radiography. In a Michigan study, prevalence of a radiographic pattern of fibrosis was 0.5 percent in men and 0.0 percent in women. In Long Beach, prevalence was 3.7 percent for men and 0.6 percent for women. Cigarette smoking did not enhance fibrosis when exposure to asbestos was light (e.g., households of shipyard workers). Asbestosis was recognized in 6.6 percent of 137 wives of shipyard workers who had never smoked and in 7.6 percent of 132 who had ever smoked. Cigarette smoking and asbestos appeared to have synergistic effects in workers occupationally exposed to asbestos (insulators): 7.2 percent of 97 nonsmokers and 20.5 percent of 316 ever smokers showed fibrosis. This apparent synergy was also found in shipyard workers up to age 70: 31 percent of nonsmokers and 43.3 percent of ever smokers had fibrosis. There were increases of approximately 10 percent in prevalence of fibrosis in cigarette smokers and nonsmokers for each decade after age 40. (Auth. Abs. Mod.)

86–1394. Kilburn, K.H.; Warshaw, R.; Thornton, J.C. **Signs of Asbestosis and Impaired Pulmonary Function in Women Who Worked in Shipyards.** *American Journal of Industrial Medicine* 8(6):545-552, 1985.

When 71 women (mean age 61.5 years) who had worked in shipyards before May 1961 were compared with a reference population without asbestos exposure, significant reductions were found in log (forced expiratory flow at 25 to 75 percent vital capacity, FEF_{25-75}), diffusing capacity ($DLCO_{sb}$), and alveolar volume (ALV) in nonsmokers; in forced expiratory volume in 1 sec (FEV_1), log (FEF_{25-75}), and log (FEF_{75-85}) in ex-smokers; and reduced AVL in current smokers. Radiographic signs of asbestos disease were found in 15 of the women: 7 had irregular opacities in the lung parenchyma and 8 had pleural disease (2 with pleural calcifications). Chronic bronchitis was diagnosed in 21 percent, 71 percent had dyspnea on climbing two flights of stairs, and 42 percent had wheezing, prevalences that were 50 percent higher than in wives of shipyard workers. In 50 white women, mean values for expiratory flow rates, log (FEF_{25-75}), and log (FEF_{75-85}) were decreased for nonsmokers, ex-smokers, and current smokers compared with values for normal nonsmokers. Ex-smokers and current smokers showed the greater effects. $DLCO_{sb}$ and ALV were also reduced in all three smoking categories. Further studies are recommended. (Auth. Abs. Mod.)

86–1395. Lebovits, A.H. **Industrially Acquired Pulmonary Disease.** *Advances in Psychosomatic Medicine* 14:78-92, 1985.

Smoking cessation is among the most effective preventive health behaviors for industrial workers occupationally exposured to carcinogens, particularly asbestos-exposed workers (such as pipecoverers), for whom the risk of dying of bronchial cancer is 92 times greater than for nonsmokers in the general population. Uranium and fluorspar miners are also at risk for lung cancer; gold miners risk chronic obstructive pulmonary disease; manual flax workers, bysinossis; coal miners and foundry workers, chronic bronchitis; and chloromethyl ether, rubber, and jute and hemp workers risk pulmonary dysfunction. Respiratory symptoms occur in meat wrappers, and smoking-related ventilatory impairment may be encountered by coal miners. There is also evidence that among patients already diagnosed with lung cancer, continuation of smoking is associated with poor prognosis. Despite the significance of reduction of cocarcinogens in the industrial environment, blue-collar, dust-exposed, and active granite workers do not smoke less than their nonsmoking counterparts, and little alteration has been found in smoking behavior of asbestos workers educated to the risk and to the synergistic interaction of cigarette smoke and asbestos. Recommendations for education, prevention, and compliance are discussed.

86–1396. McFadden, D.; Wright, J.L.; Wiggs, B., et al. **Smoking Inhibits Asbestos Clearance.** *American Review of Respiratory Disease* 133(3):372-374, March 1986.

Cigarette smoking impedes asbestos clearance from the lungs by increasing retention of short fibers, which may contribute to the rate of disease seen in asbestos workers who smoke. Thirty female Hartley strain guinea pigs, given 1 mg amosite asbestos in 0.5 mL saline by intratracheal instillation, were divided into three groups: (1) nonexposed (controls), (2) animals exposed to smoke after asbestos instillation, and (3) animals exposed to smoke before and after asbestos instillation. Asbestos fiber concentrations and sizes were measured 1 week and 1 month after exposure. Between 1 week and 1 month, the asbestos burden in controls decreased an average sixfold ($p<0.01$), whereas no significant decrease was found in the other groups. However, the mean length of retained fibers increased in controls but decreased in both smoke-exposed groups ($p<0.001$). This phenomenon was seen in tissue samples and lavage samples, although lavaged fibers were consistently shorter, thinner, and of lower aspect than tissue fibers. In smoke-exposed animals, approximately half of the fibers longer than 10 μ were cleared by 1 month, whereas virtually no fibers shorter than 10 μ were cleared. These animals also retained four times the number of long fibers than control animals. (Auth. Abs. Mod.)

86–1397. McLennan, G.; Stevens, M.W.; Walsh, R.L. **Bronchoalveolar Lavage.** *Australian and New Zealand Journal of Medicine* 15(5):659-667, October 1985.

Normal cell percentage counts in lavage fluid from smokers and nonsmokers are presented in an overview of bronchoalveolar lavage (BAL). Up to 20 times more cells are retrieved through BAL from smokers than from nonsmokers, the bulk being alveolar macrophages. The proportion of lymphocytes is similar in the two groups, but BAL from smokers contains more neutrophils. The appearance of normal cytospin preparations is depicted for smokers and nonsmokers. Other topics discussed include (1) historical perspective, (2) correct techniques, (3) normal results, (4) use of and representative results for BAL in patients with diffuse interstitial lung disease or pulmonary infections, and (5) complications and contraindications to BAL. BAL, with its low risk and high repeatability, has contributed to major advances in understanding the pathophysiology of the normal and diseased lung. Future studies of BAL applications should include its use in measurement of such factors as soluble proteins or soluble mediators of inflammation such as interleukin I, fibronectin, and interferon. Cellular and protein function research and serial BAL in diffuse interstitial lung disease are additional research applications.

86–1398. Pacht, E.R.; Kaseki, H.; Mohammed, J.R., et al. **Deficiency of Vitamin E in the Alveolar Fluid of Cigarette Smokers. Influence on Alveolar Macrophage Cytotoxicity.** *Journal of Clinical Investigation* 77(3):789-796, March 1986.

Young asymptomatic smokers and nonsmokers were evaluated by bronchoalveolar lavage before and immediately after a 3-week course of oral vitamin E (2,400 IV/day) to investigate the antioxidant protective role of vitamin E in the lung. Smoker alveolar fluid at baseline contained an average of 3.1 ± 0.7 mg/mL vitamin E compared with 20.7 ± 2.4 mg/mL in nonsmokers' alveolar fluid ($p < 0.005$). Smoker alveolar fluid vitamin E levels increased to 9.3 ± 2.3 mg/mL after supplementation, but remained significantly lower than nonsmoker baseline levels ($p < 0.01$). This deficiency was explained, in part, by increased oxidative metabolism of vitamin E to the quinone form in smokers' compared with nonsmokers' lungs. This lower vitamin E concentration may compromise the antioxidant protection afforded by alveolar fluid as it coats the lung's epithelial surface. The protective role of vitamin E was assessed with cytotoxicity experiments, which demonstrated that the killing of normal rat lung parenchymal cells by smoker alveolar macrophages was inversely related to the vitamin E content of the parenchymal cells. Findings suggest that vitamin E may be an important lower respiratory tract antioxidant, and that the deficiency seen in young smokers may predispose them to an enhanced oxidant attack on their lung parenchymal cells. (Auth. Abs. Mod.)

86–1399. Pande, J.N. **Bronchial Hyperreactivity, Annual Rate of Decline in FEV$_1$ and Chronic Airflow Obstruction: Relationship With Smoking.** *Indian Journal of Chest Diseases and Allied Sciences* 26(4):203-204, October-December 1984.

It is firmly established that tobacco smoking is the most important extrinsic factor responsible for development of chronic airflow obstruction. Compared with a normal age-related decline in forced expiratory volume in 1 sec (FEV$_1$) of 25 mL/year in nonsmokers, FEV$_1$ in smokers declines by approximately 50 mL/year. However, subjects with a family history of atopy, other manifestations of allergic diathesis, or peripheral blood eosinophilia appear to be at a greater risk of developing chronic airflow obstruction at a later date as a result of smoking. The theory that allergic constitution might predispose chronic smokers to severe irreversible chronic airflow obstruction was proposed more than two decades ago and has received renewed support in recent years. It has been demonstrated that smokers with an atopic diathesis have a higher incidence of chronic airflow obstruction and that ventilatory impairment in smokers as well as nonsmokers correlates with eosinophilia in peripheral blood. It has also been suggested that certain susceptible smokers develop hyperreactivity as a consequence of smoking and that this group would be expected to experience a more rapid decline in FEV$_1$ with continued smoking, and would ultimately develop chronic airflow obstruction. These persons need to be identified and advised to quit smoking.

86–1400. Postma, D.S.; Gimeno, F.; Van Der Weele, L.T., et al. **Assessment of Ventilatory Variables in Survival Prediction of Patients With Chronic Airflow Obstruction: The Importance of Reversibility.** *European Journal of Respiratory Diseases* 67(5):360-368, November 1985.

The relative usefulness of various indices of lung function (ir)reversibility in predicting survival was retrospectively investigated in 129 patients (64 percent smokers, 36 percent ex-smokers) with severe chronic airflow limitation. Overall survival (69 percent at 5 years, 40 percent at 10 years, and 19 percent at 18 years) was significantly lower than predicted at each interval. Many initial variables were significantly related to survival; however, the indices of reversibility were the best. The ΔFEV$_1$ percent (pred-in), the increase of forced expiratory volume in 1 sec (FEV$_1$) on bronchodilation as a percentage of the maximal attainable increase to the predicted FEV$_1$, and FEV$_1$pb percent pred, representing the severity of the fixed airflow obstruction, were significantly related to survival. When smoking was added as a main factor in influencing mortality, it appeared to influence independently both FEV$_1$pb percent pred and ΔFEV$_1$ percent (pred-in). However, FEV$_1$pb percent pred did not influence survival in smokers or ex-smokers, while ΔFEV$_1$ percent (pred-in) did. After controlling for smoking, ΔFEV$_1$ percent (pred-in) was the best indicator of reversibility in prognosis prediction.

86–1401. Pride, N.B. **Smoking and the Development of Progressive Airflow Obstruction.** *Annals of the Academy of Medicine (Singapore)* 14(3):496-502, July 1985.

Although cigarette smoking is related to development of progressive airflow obstruction, only a minority of smokers develop severe airway narrowing. With the exception of homozygous alpha$_1$-antitrypsin deficiency, causes of this variation in susceptibility between smokers are uncertain. Possible risk factors, such as exogenous irritants, bronchopulmonary infections, and endogenous host factors are discussed. Differences in local protease-antiprotease balance in lungs between smokers have not yet been studied. There is some evidence that bronchopulmonary infections are associated with progression of airflow obstruction in people with severe impairment of host defense mechanisms, and smokers with airway narrowing show increased airway reactivity, but their importance as etiological factors in smokers remains unknown. There is also some evidence that atropine and its analogues may be as or more effective than β-adrenoceptor agonists in smokers with airflow obstruction. The marked reduction in mortality from severe airflow obstruction among men up to 65 years of age in the United Kingdom probably reflects the effects of 20 years of more of favorable changes in smoking habits and environmental pollution. The epidemic of smoking-related disease now peaking in westernized countries is destined to be repeated a generation later in other parts of the world. (Auth. Abs. Mod.)

86–1402. Strohl, K.P.; Gottfried, S.B.; Van de Graaff, W., et al. **Effects of Sodium Cyanide and Nicotine on Upper Airway Resistance in Anesthetized Dogs.** *Respiration Physiology* 63(2):161-175, February 1986.

Nicotine and sodium cyanide decreased upper airway resistance in anesthetized dogs by increasing activation of upper airway muscles, which may enlarge the airway, change the route of flow, and therefore overcome collapsing forces produced by increased chest wall muscle activation. In six animals breathing spontaneously through the intact upper airway, intravenous administration of the respiratory stimulants produced a dose-related decrease in upper airway resistance, a response that was also observed in nine animals when upper airway resistance was measured across the isolated upper airway. Inspiratory resistance fell at lower doses than expiratory resistance for both nicotine and sodium cyanide. Doses of either could be given that resulted in comparable, minimal values of resistance during both inspiration and expiration. Mechanisms for changes in resistance were clarified using lateral radiographs of the neck and transbronchoscopic views of the upper airway. Pharmacologic challenge resulted in a change in the route of airflow (from nose only to nose and mouth breathing) and a change in caliber of the airway at the level of the nasopharynx and hyoid apparatus. (Auth. Abs. Mod.)

86–1403. Svartengren, M.; Hassler, E.; Philipson, K., et al. **Spirometric Data and Penetration of Particles to the Alveoli.** *British Journal of Industrial Medicine* 43(3):188-191, March 1986.

Occupational exposure to metal particles larger than a few microns, particularly under impact deposition, is a greater risk for workers with large forced expiratory volume in 1 sec (FEV$_1$) values than for those with small values. Smokers, as expected, showed the lowest correlation between spirometric values and percentage of particle retention at 24 hours, since long-term smoking impairs mucociliary transport. The risk of systemic toxic effects from penetration of particles to the alveoli was studied in 29 healthy men divided into students, nonsmoking workers, smoking workers, all nonsmokers, all workers, and all participants. The 4 μm Teflon particles (aerodynamic diameter 6 μm) were inhaled at 0.5L/seconds with maximally deep breaths. Both FEV$_1$ and forced vital capacity (FVC) correlated significantly with 24-hour retention for all nonsmokers, all smokers, and all subjects ($p < 0.05$). A significant correlation between FEV$_1$ and 24-hour retention was also shown for students. Overall, there was a better correlation between FEV$_1$ and retention than between FVC and retention. (Auth. Abs. Mod.)

86–1404. Van Cauwenberge, P.B. **Epidemiology of Common Cold.** *Rhinology* 23(4):273-282, December 1985.

Maternal cigarette smoking during pregnancy, although a factor in prematurity and low birth weight, had little influence on annual incidence of common cold and mucosal status of children. Similarly, parental smoking had only a slight effect on children's rhinological condition. The epidemiology of the common cold and the role of some predisposing factors were examined in 2,065 healthy children 2.5 to 6 years of age, using questionnaires completed by parents and physicals, clinical ear, nose, and throat examinations, and various technical investigations. Mean annual incidence of common cold was 2.43 (as reported by parents). Mucoid and purulent rhinitis were found less frequently in older children. A positive parental history of upper respiratory tract infections was the most important risk factor for occurrence of infectious rhinitis in children. (Auth. Abs. Mod.)

86–1405. Vastag, E.; Matthys, H.; Zsamboki, G., et al. **Mucociliary Clearance in Smokers.** *European Journal of Respiratory Diseases* 68(2):107-113, February 1986

Decreased mucociliary clearance (MC) in 71 smokers (15 without, 16 with simple, and 40 with obstructive chronic bronchitis) was significantly correlated with pack-years of smoking, suggesting an early functional abnormality in smokers preceding symptoms of chronic bronchitis and detectability of airways obstruction. MC was measured with ^{99m}Tc-tagged human erythrocytes; lung function was determined by whole body plethysmography. Smokers without chronic bronchitis and large airways obstruction (mean age 37.5 years) had smoked 9.3±6.1 pack-years for 14.3±11.1 years; simple chronic bronchitis patients (mean age 45.5 years) had smoked 20.5±8.5 pack-years for 21.4±9.7 years; and obstructive chronic bronchitis patients (mean age 60.2 years) had smoked 40.6±14.4 pack-years for 37.5±11.0 years. Total MC rates in

60 min ($TMC_{60\,min}$) for all groups were significantly ($p<0.001$) lower than predicted. Mean $TMC_{60\,min}$ rates of heavy smokers with simple and obstructive chronic bronchitis were significantly ($p<0.001$) lower than those of light smokers without chronic bronchitis. No significant difference was detected between $TMC_{60\,min}$ rates of smokers with simple and obstructive chronic bronchitis. Decrease in MC rates was more pronounced in central than in peripheral airways. (Auth. Abs. Mod.)

86–1406. Walter, S.; Boyapati, J. **Bronchial Lability and Its Relationship to Pulmonary Function Decline in Young Asymptomatic Smokers and Nonsmokers.** *Indian Journal of Chest Diseases and Allied Sciences* 26(4):205-213, October-December 1984.

A significant relationship between bronchial lability and changes in pulmonary function was observed in smokers and nonsmokers, with those with less labile bronchi showing greater pulmonary function decline. Pulmonary function and exercise bronchial lability were studied in 19 young asymptomatic smokers and 63 nonsmokers to compare the airway response to exercise and to identify the relationship between bronchial lability and pulmonary function decline. At study outset, pulmonary function and bronchial lability were not significantly different between smokers and nonsmokers. At the end of 1 year, peak expiratory flow had increased in both groups ($p<0.05$ in smokers and $p<0.001$ in nonsmokers), whereas forced expiratory volume in 1 sec, expressed as a percentage of forced vital capacity (FVC) and the forced expiratory flow rate between 25 and 75 percent of FVC, had decreased significantly only among smokers ($p<0.01$ and $p<0.001$, respectively). (Auth. Abs. Mod.)

See also **86–1378, 86–1445, 86–1557, 86–1558, 86–1560**

CARDIOVASCULAR DISEASES

86–1407. Adams, C.E.; Leverland, M.B. **Environmental and Behavioral Factors That Can Affect Blood Pressure.** *Nurse Practitioner* 10(11):39-40, 49-50, November 1985.

Behavioral factors that can alter blood pressure include use of tobacco and alcohol, body and extremity position, activity and exercise, food, and psychological stress. Environmental factors that cause blood pressure changes are climate, temperature, and time of day. A patient's blood pressure may vary considerably and may not be a sign of a pathological process. Smoking, or any other form of tobacco use, increases blood pressure. Nicotine causes a vasospasm of the arterial wall, resulting in an increase in blood pressure, and increases catecholamine release, leading to an increase in serum cholesterol and triglycerides and, eventually, to atherosclerosis and high blood pressure. Smoking also decreases levels of oxygen and increases levels of carbon dioxide in the blood, accelerating and intensifying arterial lesions and hypertension. Patients who suddenly begin smoking may register a fairly rapid increase in blood pressure, and decreases in blood pressure may be observed in patients who quit. When blood pressure is taken, as many transient variables as possible need to be controlled. Factors that cannot be controlled must be carefully evaluated so that blood pressure change is not interpreted as a sign of pathology. (Auth. Abs. Mod.)

86–1408. Aronow, W.S.; Starling, L.; Etienne, F., et al. **Risk Factors for Coronary Artery Disease in Persons Older Than 62 Years in a Long-Term Health Care Facility.** *American Journal of Cardiology* 57(8):518-520, March 1986.

A history of smoking 5 to 60 cigarettes/day was significantly correlated with coronary artery disease (CAD) in men ($p<0.001$) but not in women. CAD was present in 2 of 6 men (33 percent) and in 1 of 7 women (14 percent) with a history of smoking <20 cigarettes/day and in 14 of 22 men (64 percent) and in 7 of 16 women (44 percent) smoking 20 to 60 cigarettes/day. CAD occurred in 43 of 138 men (31 percent) and in 103 of 380 women (27 percent). A history of smoking 5 to 60 cigarettes/day, hypercholesterolemia (fasting total serum cholesterol ≥ 200 mg/dL), history of systolic hypertension (≥ 160 mm Hg) or diastolic hypertension (≥ 90 mm Hg), diabetes mellitus (fasting venous plasma glucose ≥ 140 mg/dL), and obesity (at least 20 percent above ideal body weight) were correlated with CAD in men (mean age 82 ± 8 years) and women (mean age 82 ± 8 years) in a long-term health care facility. Data show that (1) hypercholesterolemia was significantly correlated with CAD in both men ($p<0.001$) and women ($p<0.005$); (2) a history of systemic hypertension was significantly correlated with CAD in women ($p<0.001$) but not in men; (3) diabetes mellitus and obesity were not significantly correlated with CAD in men or women; and (4) hypercholesterolemia, a history of smoking 5 to 60 cigarettes/day, and a history of systemic hypertension were major CHD risk factors. The correlation between CAD and the major risk factors was more significant in patients who had two or three risk factors than in those with no or only one major risk factor. (Auth. Abs. Mod.)

86–1409. Chanrit, S.; Porapakkham, Y.; Viseshakul, D. **Risk Factors Related to Coronary Heart Disease: A Case Study in**

Thailand. Part 2. *Journal of the Medical Association of Thailand* 68(10):508-516, October 1985.

Smoking, gender, systolic and diastolic blood pressure, fasting blood sugar, and serum cholesterol levels were important risk factors in a retrospective study of 358 Thai coronary heart disease (CHD) patients. The relative risk (RR) for men was 5.1 times higher than for women, and the RR for smokers was 2.4 times higher than for nonsmokers. Compared with nonsmokers, RR for smokers consuming ≤ 20 cigarettes/day was 2.8. For heavy smokers (≥ 20 cigarettes/day), RR was 10.9 compared with nonsmokers. Smoking is considered the most significant risk factor because the increased risk can be reduced by cessation. Additional risk was associated with (1) blood pressure (systolic >160 mm Hg, RR 20.2 and diastolic >90 mm Hg, RR 10.8); (2) fasting blood sugar (>120 mg/100 mL, RR 264.2); and (3) serum cholesterol (200 mg/100 mL, RR 4.3). It is concluded that a combination of weak risk factors (e.g., age and systolic blood pressure, age and serum cholesterol, smoking and systolic blood pressure, smoking and serum cholesterol) provide more risk of CHD than a single risk factor.

86–1410. Cox, R.H.; Santamore, W.P.; Tulenko, T.N. **Alterations in Canine Coronary Arteries Produced by Chronic Cigarette Smoking.** *Proceedings of the Society for Experimental Biology and Medicine* 181(1):157-162, January 1986.

Passive and active force—length relations and collagen and elastin content, water content and distribution, and total electrolyte content were determined for segments of left circumflex coronary artery obtained from beagle dogs that had been exposed to cigarette smoke for 2 years and from nonsmoking controls. No significant differences were found in passive mechanical properties or collagen and elastin content of arteries from the two groups. Maximum values of active force development were increased in arteries from smoke-exposed dogs as were values on the ascending part of the active force—length curve. Total water content and the distribution space of an extracellular marker (^{60}Co-EDTA) were not significantly different among arteries from the two groups. Values of cell volume were not different between the two groups and it is suggested that the above differences in active force development represent alterations in smooth muscle cells at the subcellular level. Results suggest that the contribution of chronic smoking as one of a group of cardiac risk factors may be due to an effect of augmenting coronary artery smooth muscle contractility. (Auth. Abs. Mod.)

86–1411. Croft, J.B.; Foster, T.A.; Parker, F.C., et al. **Transitions of Cardiovascular Risk From Adolescence to Young Adulthood—The Bogalusa Heart Study: I. Effects of Alterations in Lifestyle.** *Journal of Chronic Diseases* 39(2):81-90, 1986.

Data on persons aged 18 to 24 years in the Bogalusa Heart Study showed that (1) 36 percent of white men and 28 percent of white women were smokers compared with 24 percent of black men and 12 percent of black women; (2) 30 percent of white men smoked ≤ 10 cigarettes/day compared with 23 percent of white women, 15 percent of black men, and 10 percent of black women; (3) 13 percent of white men had smoked ≥ 5 years compared with 10 percent of white women and 3 percent of black men; (4) almost 76 percent of black women were never smokers; and (5) 29 percent of black men, 25 percent of white women, 17 percent of white men, and 12 percent of black women were ex-smokers. In young white women, cigarette smoking and oral contraceptive use were independently related to elevated β-lipoprotein cholesterol and decreased α-lipoprotein cholesterol levels. Among young adults who had reported never smoking 3 years earlier, approximately 80 percent were still nonsmokers. Among those who had reported 3 years earlier that they had tried cigarettes but had quit, 50 percent of black men, 41 percent of white women, 38 percent of white men, and 25 percent of black women resumed smoking. Among previous smokers, 50 percent of black women, 40 percent of black men, 30 percent of white women, and 18 percent of white men reported having quit.

86–1412. De Lorgeril, M.; Reinharz, A.; Busslinger, B., et al. **Acute Influence of Cigarette Smoke in Platelets, Catecholamines and Neurophysins in the Normal Conditions of Daily Life.** *European Heart Journal* 6(12):1063-1068, December 1985.

Smoking provoked a significant increase of nicotine-stimulated neurophysin ($p < 0.05$), indicating an increase in vasopressin, which could promote coronary spasm or elevate coronary resistance in patients with coronary artery disease. The effect of smoking on beta-thromboglobulin, thromboxane B_2, epinephrine, norepinephrine, estrogen-stimulated neurophysin, and nicotine-stimulated neurophysin was analyzed in healthy smokers (14 men and 8 women, average age 30 years) under normal conditions of daily life. The volunteers, chosen for their capacity to inhale tobacco smoke, included four women who were taking oral contraceptives. Cigarette smoking, which is firmly associated with acute coronary events, did not induce platelet activation, thromboxane formation, catecholamine release, or estrogen-stimulated neurophysin secretion. It is concluded that recently demonstrated benefits from cessation of smoking after myocardial infarction, i.e., higher survival rates and lower cumulative infarction frequencies, may be the result of improvement of vasopressin secretion rather than platelet activation or catecholamine release. Further studies are needed to confirm this hypothesis. (Auth. Abs. Mod.)

86–1413. Dizinger, H.G.; Ringelstein, E.B. **Die Diagnostik des Schlaganfalls bei Jungen Erwachsenen. [Diagnosis of Stroke in Young Adults.]** *Deutsche Medizinische Wochenschrift* 110(46):1759-1765, November 1985, German.

Smoking was a contributing factor to stroke in 42 young patients (aged <36 years), and was the main cause in hypertensive smokers with diastolic pressure readings of 110 mg Hg and in women who smoked >20 cigarettes/day and used contraceptives. Causes, analyzed according to etiopathogenetic and prognostic criteria, could be explained with certainty in only 10 patients and with high probability in 8. In 25 percent, etiology was completely obscure. Diagnostic gaps existed especially in hemostatic, virological, and cardiological areas. Some patients continued to smoke during followup, disregarding the warning about the ill effects of smoking. Three patients died. Followup showed that 40 percent were able to resume previous occupations. Relapses were observed in cases with disseminated lupus erythematosus and endocarditis. Because of the relatively low rate of clarified cases (partly the result of selection and partly of gaps in diagnostic knowledge), a stepwise diagnostic program was set up that took into account not only the minimal needs for a sound initial diagnosis but also the extensive differential diagnoses for less common causes of stroke. (Auth. Abs. Mod.)

86–1414. Elam, M.B.; Viar, M.J.; Ratts, T.E., et al. **Mitral Valve Prolapse in Women With Oral Contraceptive-Related Cerebrovascular Insufficiency: Associated Persistent Hypercoagulable State.** *Archives of Internal Medicine* 146(1):73-77, January 1986.

Retrospective examination of 11 former oral contraceptive (OC) users who had experienced cerebrovascular insufficiency during use found that, compared with 12 asymptomatic OC users, more former users had vascular headache and auscultatory and echocardiographic findings of mitral valve prolapse. Women were examined for presence of hypercoagulable states and potential risk factors. Five of the former users were smokers; all controls were nonsmokers ($p < 0.05$). The observed association of mitral valve prolapse with OC-related cerebrovascular insufficiency was particularly striking in that eight women exhibited auscultatory evidence and six met stringent echocardiographic criteria for the syndrome. Hypercoagulability was also observed among former OC users and was evidenced by decreased antithrombin III activity, increased platelet coagulant activity, and elevated plasma β-thromboglobulin levels. It is proposed that preexisting hypercoagulable states, such as may exist in a subset of individuals with mitral valve prolapse, will magnify the risk of OC-related cerebrovascular morbidity.

86–1415. Green, M.S.; Jucha, E.; Luz, Y. **Ethnic Differences in Selected Cardiovascular Disease Risk Factors in Israeli Workers.** *Israel Journal of Medical Sciences* 21(10):808-816, October 1985.

Ethnic differences in the distribution of coronary heart disease risk factors were investigated between 1979 and 1982 in 2,355 Jewish and Arab factory employees in Israel. Among young men, those born in Eastern Europe smoked the most and those born in Western Europe smoked the least (58.6 vs. 45.1 percent, respectively), but the difference was not statistically significant. Among older men, those from the Gaza Strip and North Africa smoked the most (54.6 and 46.3 percent) and those born in Western Europe smoked the least (25.5 percent, $p < 0.01$). Among young women, the North African and Israeli groups smoked the most (36.1 percent) and the Asian group smoked the least (12.2 percent, $p < 0.05$). Among older women, those born in North Africa smoked the least (11.5 percent) and those from Europe or Asia smoked the most (20.0 percent, not significant). Among both sexes, blood pressure (BP) was significantly higher in those of European origin than in those of Asian or North African origin, mainly in the 20- to 39-year age group. Older Western European men had the highest prevalence of electrocardiographic (ECG) abnormalities and cardiovascular disease, while Arab workers from the Gaza Strip had the lowest. Findings indicate that ethnic differences in BP are evident in the younger age group, whereas smoking behavior and relative weight differ mainly at an older age. (Auth. Abs. Mod.)

86–1416. Hazuda, H.P.; Haffner, S.M.; Stern, M.P., et al. **Employment Status and Women's Protection Against Coronary Heart Disease. Findings From the San Antonio Heart Study.** *American Journal of Epidemiology* 123(4):623-640, April 1986.

Among 1,041 Mexican-American and non-Hispanic white women (25 to 64 years of age) randomly selected from three socioculturally distinct neighborhoods in San Antonio, currently employed women were at less risk of coronary heart disease than full-time homemakers. No statistically significant differences between employed women and homemakers were found for cigarette smoking, obesity, total serum cholesterol, low density lipoprotein cholesterol, or systolic and diastolic blood pressure. Highly significant differences were found in levels of high density lipoprotein (HDL) cholesterol, ratio of HDL cholesterol to total cholesterol, and triglycerides, which were not explained by smoking, obesity, exercise, alcohol consumption, use of exogenous estrogens, or use of oral contraceptives, or by the healthy worker effect, and were observed at all occupational levels. Employed women ate a less atherogenic diet than full-time homemakers, but it is not clear that this nutritional factor could explain the differences in HDL cholesterol and triglyderides. The magnitude of employment status difference in HDL cholesterol for both ethnic groups was in a range (3-4 mg/100 mL) associated with protection against against coronary disease. (Auth. Abs. Mod.)

86–1417. Hickey, N. **The Aetiology of Coronary Heart Disease: Implications for the Family Doctor.** *Irish Medical Journal* 78(10):291-292, October 1985.

Smoking, serum cholesterol, and hypertension are major risk factors for coronary disease. Smoking may not be an essential atherogenic factor, but in patients with elevated cholesterol, it increases the risk of premature disease. Smoking appears to be related to development of discrete obstructive lesions in coronary arteries, particularly among the young. In populations with uniformly low levels of serum cholesterol, smoking does not appear to be a strong factor. But in Ireland, where average cholesterol levels are high, the additive effect of smoking is lethal. With even average or slight increases in serum cholesterol levels, cigarette smoking significantly increases the risk of sudden death and coronary artery disease. The family doctor, who is in a strong position to influence the health of the community, should become involved in a primary prevention program, identifying patients at risk (including all men between the ages of 20 to 35 years), and collecting data on smoking habits, family history of sudden death, coronary heart disease, serum cholesterol, and blood pressure. Setting aside one session on a regular basis to provide advice and treatment to patients at risk could have a significant effect on premature coronary heart disease.

86–1418. Hock, C.E.; Passmore, J.C. **Mechanisms Mediating Canine Renal Vasoconstriction Induced by Nicotine Infusion.** *Life Sciences* 37(21):1997-2003, November 25, 1985.

Nicotine infusion (0.024 mg/kg/min) increased mean arterial blood pressure (MABP) from 114±3.0 to 219±8.0 mm Hg and decreased total renal blood flow (TRBF) 3.12±0.34 to 1.60±0.37 mL/min/g in dogs in an investigation of the role of the renin-angiotensin and alpha-adrenergic systems in nicotine-induced renal vasoconstriction, using saralasin (4 μg/kg/min) and phentolamine (25 μg/kg/min) blockade. Nicotine infusion significantly reduced blood flow in the outer cortex (OC), inner cortex (IC), and outer medulla (OM). Intrarenal-artery infusion of saralasin or phentolamine had no effect on nicotine-induced MABP changes. There was a significantly greater TRBF ($p<0.01$), OC ($p<0.001$), IC ($p<0.001$), and OM ($p<0.01$) flow in dogs that received phentolamine infusion prior to nicotine than in dogs that received nicotine only. Saralasin pretreatment prior to nicotine resulted only in significantly greater OC flow ($p<0.01$) than nicotine only. Data suggest that although angiotensin II mediates a portion of the action of nicotine on the OC renal vasculature, the alpha-adrenergic system predominates as the mediator of nicotine-induced renal vasoconstriction in the first 7 minutes of nicotine infusion. (Auth. Abs. Mod.)

86–1419. Inoue, Y. **Kitsuen no Myakurakumaku Junkan ni Oyobosu Eikyo. [Effects of Cigarette Smoking on Choroidal Circulation. I. Acute Phase.]** *Acta Societatis Ophthalmologicae Japonicae* 89(11):92-97, 1985, Japanese.

Acute smoking effects on choroidal vessels are not well understood despite extensive studies of the effects of smoking on the cardiovascular systems of humans and experimental animals. Choroidal blood flow (measured by the hydrogen clearance method in 31 generally anesthetized rabbits) showed a 10 to 20 percent reduction in blood flow following cigarette smoke inhalation or intraveous administration of saline extracts of smoke. The reduction was attributed to constriction of choroidal vessels and to the decline in cardiac output. (Auth. Abs. Mod.)

86–1420. Ito, B.R.; Feigl, E.O. **Carotid Chemoreceptor Reflex Parasympathetic Coronary Vasodilation in the Dog.** *American Journal of Physiology* 249(6, part 2):H1167-H1175, December 1985.

Intracarotid injection of 0.1 μg/kg nicotine produced prompt, transient atrial bradycardia and increased coronary blood flow and coronary sinus oxygen tension in an examination of the reflex response of the canine coronary vascular bed to carotid chemoreceptor activation with hypoxia and hypercapnia or with nicotine and cyanide. Similar increases in coronary flow and coronary sinus oxygen tension were obtained with nicotine injections of 0.2 μg/kg. Responses to both concentrations were abolished by 0.5 mg/kg atropine. Intracarotid injection of 150 μg cyanide produced similar but slightly more pronounced alterations, which were also abolished by atropine. Changes in mean aortic pressure in response to nicotine or cyanide were less than 10 mm Hg and were similar before and after atropine administration. Carotid body chemoreceptor stimulation with hypoxic or hypoxic-hypercapnic blood for 90 sec produced atrial bradycardia and a transient increase in coronary blood flow of 36 to 53 percent above prestimulation values. Augmented coronary flow was accompanied by a transient increase in coronary sinus O_2 tension of 4.6 to 5.7 mm Hg. Aortic blood pressure varied less than 10 mm Hg. Coronary response to hypoxic blood stimulation was also blocked by atropine. It is concluded that transient reflex parasympathetic coronary vasodilation is elicited not only by nicotine and cyanide but also by hypoxic or hypoxic-hypercapnic stimulation of carotid body chemoreceptors.

86–1421. Klatcky, A.L.; Friedman, G.D.; Armstrong, M.A. **The Relationships Between Alcoholic Beverage Use and Other Traits to Blood Pressure: A New Kaiser Permanente Study.** *Circulation* 73(4):628-636, April 1986.

Smoking and coffee or tea consumption were not associated with higher blood pressure (BP) among 80,000 persons of several races in San Francisco. However, the relationship of alcohol use with higher BP was reconfirmed as being slightly stronger in men, whites, and persons 55 years of age or older. BP of white cigarette smokers was slightly higher than that of nonsmokers, but BP in black smokers was similar to that of nonsmokers. BP was slightly higher in men who drank one to two drinks/day, and a continuous increase occurred at all higher drinking levels among white men with constant drinking habits. Among women, an increase occurred only at three or more drinks/day. Abstinence can produce complete regression within days. Drinkers of hard liquor had higher adjusted mean BP than those preferring wine or beer. Results suggest that the association of alcohol and BP is causal. Systolic pressure showed a positive relationship to total serum calcium and an inverse relationship to serum potassium, but diastolic pressure showed little relationship to these blood constituents. A possible direct effect on regulation of blood pressure is suggested. Because alcohol-related hypertension might be controlled by omitting the offending agent instead of adding antihypertensive drugs, the public health implications are substantial. (Auth. Abs. Mod.)

86–1422. Krivokapich, J.; Schneider, N.G.; Child, J.S., et al. **Cardiovascular Effects of Nicotine Gum and Cigarettes Assessed by ECG and Echocardiography.** In: Grabowski, J.; Hall, S.M. (Editors). *Pharmacological Adjuncts in Smoking Cessation.* U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse Monograph 53, DHHS Publication No. (ADM)85-1333, 1985, pp. 42-55.

Acute cardiovascular effects of nicotine were determined in 14 male smokers, using low- and high-nicotine cigarettes (0.2 and 2 mg) and 2 and 4 mg nicotine gum as the four treatment conditions. Each man served as his own control for all conditions. Significant posttreatment changes included (1) increased carbon monoxide levels after smoking either cigarette; (2) increased heart rate after smoking 2 mg cigarettes; (3) increased systolic, diastolic, and mean blood pressures after smoking 2 mg cigarettes; and (4) increased light-headedness reported at 5 minutes for 2 mg cigarettes. No significant changes in heart rate, blood pressure, electrocardiographic parameters, or echocardiographic measures of left ventricular function were observed following use of either 2 or 4 mg nicotine gum. From a cardiovascular perspective, nicotine gum may be a safe method for smoking cessation; however, cardiovascular effects after multiple doses of gum or effects in individuals with significant cardiovascular or pulmonary disease were not examined.

86–1423. Kunze, D. **Risk Factors of Atherosclerosis in Children and Adolescents.** *Boletin de la Asociacion Medica de Puerto Rico* 77(9):381-382, September 1985.

Smoking is an important risk factor of arteriosclerosis and prevention of degenerative vascular disease in children and adolescents should be started before the age of 13. Children at ages of 11 through 13 years enter the critical period of smoking initiation that, if not discouraged, can develop into a lifelong habit. In western industrialized countries, 30 percent of children between 13 and 18 years are smokers, with higher incidence among girls than among boys. Excesses in other risk factors (lipid levels, blood pressure, and body weight) also need to be controlled during childhood because later in life, general behavior and smoking and eating habits become too strongly fixed for educational influences to succeed. In spite of fairly wide recognition among the medical profession that arteriosclerosis is a multifactorial process subject to both genetic and environmental causes, there is still too little being done by physicians to change lifestyle attitudes of patients. It is suggested that all primary prevention efforts be started in childhood to inhibit development of early arteriosclerosis and that the medical profession cooperate with educators, communities, industry, and private initiatives in a combined program emphasizing a healthy lifestyle.

86–1424. Listewnik, M.J.; Wiechowski, S.; Szumilowicz, G., et al. **Wpływ Podawania Acenokumarolu Oraz Palenia Tytoniu na Odlegle Wyniki Zabiegow Naprawczych w Przebiegu Miazdzycowej Niedroznosci Tetnic Konczyn Dolnych. [An Effect of Acenocoumarol and Tobacco Smoking on the Remote Results of Reparative Procedures in the Course of Atherosclerotic Stenosis of Leg Arteries.]** *Polski Tygodnik Lekarski* 40(43):1197-1201, October 1985, Polish.

Smoking influenced long-term recovery of patients who underwent restorative surgery for atherosclerotic stenosis of the lower extremities. Following surgery, 269 habitual smokers (254 men) aged 28 to 74 years were divided into subgroups according to smoking status and treatment with acenocoumarol. Positive results were obtained in 29 of 86 untreated smokers and in 59 of 87 treated smokers ($p<0.001$). Positive results were also obtained in 29 of 41 untreated nonsmokers and in 109 of 123 treated nonsmokers ($p<0.001$). In comparing results of treated and untreated smokers and nonsmokers, it was evident that differences in recovery outcome depended on type of therapy rather than on percentage of smokers in the group; however, long-term recovery was definitely enhanced in patients who quit smoking following surgery. It is concluded that cessation of smoking and treatment with anticoagulant medication following surgery produced the best postoperative recovery.

86–1425. Lowe, G.D.O.; Machado, S.G.; Krol, W.F., et al. **White Blood Cell Count and Haemotocrit as Predictors of Coronary Recurrence After Myocardial Infarction.** *Thrombosis and Haemostasis* 54(3):700-703, October 1985.

Among the myocardial infarct (MI) patients examined (1,756 men and 267 women), ex-smokers and smokers had higher hematocrit and white cell count (WCC) than nonsmokers, suggesting that the effects of smoking are not entirely reversible. Hematocrit and WCC, as possible predictors of recurrent coronary events and mortality, were examined in 551 current smokers (459 men and 92 women), 1,142 ex-smokers (1,047 men and 95 women), and 330 nonsmokers (250 men and 80 women) enrolled in the study 2 to 60 months after MI. In both sexes, baseline hematocrit and baseline WCC increased ($p<0.001$) with increasing cigarette consumption, although there was some evidence of a reversal of trend among heavy smokers (>2 packs/day). Hematocrit was higher in men than in women after correcting for smoking ($p<0.001$), but sex had no apparent effect on WCC. Hematocrit and WCC were higher in current smokers than in ex-smokers ($p<0.001$) and higher in ex-smokers than in nonsmokers ($p<0.001$). Compared with smokers and nonsmokers, ex-smokers (both men and women) had less risk of coronary recurrence and death. Baseline serum cholesterol was unrelated to smoking. WCC was strongly related to coronary recurrence and total mortality; however, no such relationships were found for hematocrit. WCC is therefore an easily measured prognostic variable in surviviors of MI. It is suggested that white blood cells may promote MI by capillary plugging and/or release of toxic oxygen metabolites. (Auth. Abs. Mod.)

86–1426. Mall, T.; Grossenbacher, M.; Perruchoud, A.P., et al. **Influence of Moderately Elevated Levels of Carboxyhemoglobin on the Course of Acute Ischemic Heart Disease.** *Respiration* 48(3):237-244, 1985.

Data indicate that a moderately elevated level of carboxyhemoglobin (COHb) is not just a marker for recent smoking, but also may aggravate the course of acute ischemic heart disease (IHD). Patients with COHb levels >2 percent at time of hospital admission suffered more severe forms of IHD and more major arrhythmias than patients with COHb levels of ≤ 2 percent. Higher maximal CPK values were observed in patients with transmural infarction (TI). Analysis of 33 smokers, 15 exsmokers, and 18 nonsmokers with acute IHD showed that 31 patients had COHb levels of ≤ 2 percent and 35 had levels of >2 percent. TI developed more often in patients with elevated COHb, but the difference was not significant ($p=1.123$). Patients with TI had higher maximum CPK values ($p<0.01$) when COHb levels were >2 percent. During the first 6 hours after hospital admission, these patients needed antiarrhythmic treatment significantly more frequently ($p=0.003$) than other patients. Differences in rhythm disorders were still present at a time when nicotine, owing to its short biological half-life, was already eliminated. (Auth. Abs. Mod.)

86–1427. McIntyre, L.; Shah, C.P. **Prevalence of Hypertension, Obesity and Smoking in Three Indian Communities in Northwestern Ontario.** *Canadian Medical Association Journal* 134(4):345-349, February 1986.

In three northwestern Ontario communities, 56.4 percent of the 668 Canadian Indian natives surveyed for prevalence of hypertension and obesity were smokers. More than 37 percent smoked daily and most were under 35 years of age. Men smoked more cigarettes/day, had been smoking longer, and were more regular smokers than women. The highest percentage of smokers was among those aged 15 to 24 years, and with the exception of this group, nonsmokers outnumbered smokers in all age groups. There were very few smokers over 65 years of age. Daily smoking was not related to hypertension, but long duration of smoking (usually an effect of age) was positively related. Amount smoked was not related to hypertension, probably because heavier smoking occurred in the younger natives. Findings indicated that 13 percent of those over the age of 15 (generally women) were hypertensive. Seventy percent of women aged 35 to 64 years and 50 percent of men aged 35 to 44 years were obese, indicating that weight gain increased with age.

86–1428. Neser, W.B.; Thomas, J.; Semenya, K., et al. **Obesity and Hypertension in a Longitudinal Study of Black Physicians: The Meharry Cohort Study.** *Journal of Chronic Diseases* 39(2):105-113, 1986.

Smoking, obesity, diastolic blood pressure, and parental history of stroke or hypertension were strongly associated with hypertension in nearly 44 percent of black medical students examined 22.5 years later as practicing physicians. Of the 341 physicians who became obese, 59 percent were hypertensive compared with 40 percent of the nonobese, 36 percent of those initially obese only, and 45 percent of those obese on both examinations. The risk ratio was 1.7 for the most obese (≥ 130 percent relative body weight) compared with 1.0 for the leanest group. Dynamic weight change and baseline diastolic blood pressure were more prominent precursors than other variables such as smoking, length of time between examinations, and parental history of stroke or hypertension. It is concluded that weight control appears to be a potentially important nonpharmacologic hypertension risk reduction measure. (Auth. Abs. Mod.)

86–1429. Raichlen, J.S.; Healy, B.; Achuff, S.C., et al. **Importance of Risk Factors in the Angiographic Progression of Coronary Artery Disease.** *American Journal of Cardiology* 57(1):66-70, January 1986.

Analysis of sequential coronary angiograms identified cigarette smoking, blood pressure (BP), diabetes mellitus, and physical activity as important risk factors in the progression of coronary artery disease (CAD). Serial angiograms of 32 patients with established CAD showed strong linear correlations between extent of disease progression and diastolic BP ($p=0.002$), systolic BP ($p=0.094$), number of pack-years smoked among current smokers ($p=0.022$), fasting blood glucose level ($p=0.017$), and low levels of physical activity at leisure ($p=0.097$). Although specific risk factors correlate with development of clinical coronary events, little was known about their importance in patients with established CAD. A numerical scoring system was used to assess serial coronary angiograms in patients who had detailed risk factor determination. Results merit attention in management of patients with symptomatic CAD and in secondary coronary prevention trials investigating risk factor modification. (Auth. Abs. Mod.)

86–1430. Sharpe, N.; Vedin, A.; Wilhelmsen, L., et al. **Trends in Coronary Heart Disease Mortality in New Zealand and Sweden. Why the Difference?** *New Zealand Medical Journal* 98:1002-1005, November 1985.

The hypothesis that diet is a principal determinant of coronary disease incidence, mortality, and trends is supported by other population studies between countries (exemplified by Japan's extraordinarily low coronary mortality, despite a high prevalence of hypertension and smoking). Coronary heart disease mortality has shown a downward trend in New Zealand during the 1970s, as in most western countries. In Sweden, however, there has been a continuing increase in coronary mortality among men despite use of similar hypertension detection and control measures and a similar reduction in cigarette smoking. In 1970, 44 percent of men and 34 percent of women aged 18 to 70 years in Sweden were daily smokers; in 1981, the proportion of daily smokers had declined to 30 percent among men and 31 percent among women. Between 1976 and 1981 in New Zealand, prevalence of smoking declined from 40 to 35 percent among men and from 32 to 29 percent among women. Significant beneficial dietary changes have occurred in New Zealand during the past two decades, but in Sweden, although actively promoted, dietary change has not occurred. It is concluded that population dietary change is an important prerequisite for effective primary prevention, and in its absence, the effect of primary and secondary preventive measures may be limited. (Auth. Abs. Mod.)

86–1431. Vlietstra, R.E.; Kronmal, R.A.; Oberman, A., et al. **Effect of Cigarette Smoking on Survival of Patients With Angiographically Documented Coronary Artery Disease. Report From the CASS Registry.** *Journal of the American Medical Association* 255(8):1023-1027, February 1986.

Patients with coronary artery disease (CAD) who quit smoking had a lower rate of hospitalization for myocardial infarction (MI) and lower mortality than patients who did not quit. Morbidity and mortality were evaluated in 4,165 smokers (2,675 continuing smokers and 1,490 ex-smokers) with angiographically proved CAD. After 5 years, mortality among smokers was 22 percent compared with 15 percent for quitters (relative risk, 1.55). Frequency of MI-associated death was 7.9 percent for smokers and 4.4 percent for quitters (<0.0001); frequency for sudden death was 2.8 percent for smokers and 1.5 percent for quitters (<0.01). Rate of hospitalization for MI for continuing smokers at 5 years was 11.3 percent compared with 7.1 percent for quitters. Improved survival in quitters was highly significant in patients treated medically, among whom the pooled survival rate at 5 years was 82 percent compared with 73 percent for smokers ($p<0.0001$). Among patients treated surgically, the difference was still significant: pooled 5-year survival rates of 90 percent for quitters and 84 percent for smokers ($p<.001$). The survival benefit of quitting smoking that was observed is of a magnitude similar to the benefits expected from administration of β-adrenergic blocking agents to patients in the first few months after MI and from coronary artery bypass surgery in selected patients. (Auth. Abs. Mod.)

86–1432. Von Arbin, M.; Britton, M.; De Faire, V., et al. **Circulatory Manifestations and Risk Factors in Patients With Acute Cerebrovascular Disease and in Matched Controls.** *Acta Medica Scandinavica* 218(4):373-380, 1985.

The occurrence of various circulatory manifestations and risk factors was evaluated in a consecutive series of 209 patients admitted for acute cerebrovascular disease (CVD) and 209 control patients admitted for acute surgical disorders. Smoking was much more common among men than among women in both groups. Comparison of smoking habits between the two groups revealed significantly more nonsmokers among CVD patients compared with controls (55 vs. 43 percent, respectively, $p<0.05$). There were fewer present and former smokers among the CVD patients, but the difference compared with controls was not significant. Old and recent myocardial infarction, atrial fibrillation, congestive heart failure, and reduced arterial blood pressure in the big toe were all much more frequently noted in CVD patients than in controls. Hypertension, diabetes mellitus, overweight, and high hemoglobin values were also overrepresented in CVD patients. Findings indicate that CVD in old age is strongly related to hypertension and a generalized atherosclerosis. The heavy accumulation of primary risk factors, many of which are considered to be primarily associated with atherosclerosis among elderly stroke victims, may indicate their contribution to a progressive atherosclerotic process still in operation. The lack of an observed association between smoking and CVD agrees with past research. (Auth. Abs. Mod.)

86–1433. Watkins, L.O.; Neaton, J.D.; Kuller, L.H. **Racial Differences in High-Density Lipoprotein Cholesterol and Coronary Heart Disease Incidence in the Usual-Care Group of the Multiple Risk Factor Intervention Trial.** *American Journal of Cardiology* 57(8):538-545, March 1986.

Black men had lower relative risk of coronary heart disease (CHD) than white men in an investigation of whether higher levels of high-density lipoprotein cholesterol (HDL-C) protects blacks from the disease. After adjustment for age, diastolic blood pressure, cigarettes consumed/day, HDL-C, and low-density lipoprotein cholesterol (LDL-C), the black-white relative risk was 0.57. The relationship between HDL-C and 7-year incidence of CHD was examined in 5,792 white and 465 black men. The number of cigarettes smoked/day was a significant determinant of HDL-C (with alcohol consumption and body mass index) at baseline in both races. More blacks were smokers, but they smoked fewer cigarettes. At baseline, mean diastolic blood pressure and prevalence of cigarette smoking were significantly higher among black men, but the reverse was true for serum cholesterol (246 vs. 254 mg/dL, $p<0.01$). Mean HDL-C was higher in black men than in white men (49.3 vs. 41.6 mg/dL, $p<0.01$), but LDL-C levels were similar (159 vs. 160 mg/dL). During followup, 16 black and 404 white men sustained CHD events (5.1 vs. 10.4/1,000 person-years of risk), but no black men died of stroke. The black-white relative risk was 0.49 ($p=0.005$). Cox regression analyses revealed an inverse, but not significant association between HDL-C and CHD events. Although CHD incidence was lower in blacks, the different distributions of HDL-C may not account for the difference. (Auth. Abs. Mod.)

86–1434. Winniford, M.D.; Wheelan, K.R.; Kremers, M.S., et al. **Smoking-Induced Coronary Vasoconstriction in Patients With Atherosclerotic Coronary Artery Disease; Evidence for Adrenergically Medicated Alterations in Coronary Artery Tone.** *Circulation* 73(4):662-667, April 1986.

In patients with atherosclerotic coronary artery disease, cigarette smoking increases myocardial oxygen demand, but may cause an inappropriate decrease in coronary blood flow and myocardial oxygen supply. In 36 chronic smokers (≥ 10 cigarettes/day, ≥ 10 years) with coronary artery disease, smoking-induced coronary vasoconstriction was the result of an α-adrenergically mediated increase in coronary artery tone.

Heart rate—systolic arterial pressure double product and coronary sinus blood flow (by thermodilution) were measured prior to and during smoking both before and after injection of (1) normal saline (5 controls); (2) 5 mg phentolamine, an α-adrenergic-blocking agent (15); (3) 0.1 mg/kg propranolol, a β-adrenergic—blocking agent (12); or (4) 0.4 to 0.8 μ/kg/min of sodium nitroprusside to 4 smokers, in a dose sufficient to diminish systolic arterial pressure by 15 percent. During the initial smoking period, rate—pressure product increased and coronary sinus blood flow was unchanged by smoking in all groups. After 30 to 75 minutes, saline, phentolamine, propranolol, or sodium nitroprusside was given and measurements were repeated. In controls, rate—pressure product and coronary sinus blood flow responded in a similar manner to that observed previously. In those receiving phentolamine, rate—pressure product was unchanged, but coronary sinus blood flow rose substantially with smoking (percent change $+2 \pm 15$ percent before phentolamine and $+32 \pm 17$ percent after phentolamine, $p < 0.01$). In patients who received propranolol, rate—pressure product was unchanged, but coronary sinus blood flow decreased with smoking (percent change $+5 \pm 14$ percent before propranolol and -12 ± 5 percent after propranolol, $p < 0.01$). In those receiving sodium nitroprusside, rate—pressure product fell slightly and coronary sinus blood flow responded similarly to that observed previously. (Auth. Abs. Mod.)

See also **86–1327, 86–1528**

PREGNANCY AND INFANT HEALTH

86–1435. Boyd, M.D. **Patient Motivation During Pregnancy.** *Maryland Medical Journal* 34(10):977-981, October 1985.

Various motivational strategies are discussed to encourage women to quit smoking during pregnancy. Not all patients have the same level of motivation to change habits that may harm them or their unborn infants, nor do women's motivational levels remain the same throughout pregnancy. The physician can serve as a motivator by establishing open communication, maintaining close supervision, helping the women realize that smoking can be controlled, and assisting in devising a simple, specific course of action to decrease the use of tobacco. Behavior modification strategies discussed are (1) reminders, (2) contracts, (3) graduated regimen implementation, and (4) self-monitoring. In addition, support from the patient's husband or partner, family, and friends is important to keep the patient motivated to continue modification of tobacco use. Social support is a vital aspect of patient adherence to recommended regimens. (Auth. Abs. Mod.)

86–1436. Dowler, J.K. **Behavioral Effects of Pre- and Postnatal Exposure to Smoking, Alcohol, and Caffeine in 5-Month-Old Infants.** Doctoral Dissertation, Wayne State University, Detroit, University Microfilms International 85-14128, 1985, 125 pp.

Behavioral effects of maternal pre- and postnatal smoking and alcohol and caffeine consumption were examined in 179 5-month-old Caucasian infants and their middle-class mothers. Measures of exposure were derived from maternal interviews and questionnaire responses; infants were administered the Bayley Scales of Infant Development at 5 months. Infant irritability during testing was rated on a seven-point scale. Infants of mothers who were heavy smokers prior to pregnancy reportedly had fewer sleep difficulties, suggesting that smoking is positively related to placidity, which may be reflected within a few days of birth and several months later as well. Smoking exposure via breastfeeding (an important source of exposure to the three substances) was also associated with fewer sleep disturbances. Caffeine exposure via breastfeeding was associated with higher psychomotor developmental index scores and with better performance on the first principal component. In contrast, infants whose mothers consumed more alcohol postnatally received lower scores on the first principal component. Alcohol consumption prior to pregnancy and postnatally was related to greater irritability during the Bayley exam. Of the 61 women who smoked prior to pregnancy, 70 percent reported smoking at least one pack/day and 10 percent reported smoking two or more packs/day. Thirty percent of the smokers abstained during pregnancy. Of those who continued smoking, 61 percent smoked less than one pack/day (median, 0.55 packs/day). Smoking increased significantly following pregnancy over the rate during pregnancy, but mean consumption was significantly less than the prepregnancy rate. (Auth. Abs. Mod.)

86–1437. Feldman, P.R. **Smoking and Healthy Pregnancy: Now is the Time to Quit.** *Maryland Medical Journal* 34(10):982-986, October 1985.

Women who quit smoking before conception may expect improved pregnancy outcome. If smoking cessation can be achieved by the fourth month of pregnancy, the risks for mother and fetus are nearly as low as for the nonsmoker. Reducing consumption has also been shown to lessen incidence of spontaneous abortions, placenta previa, placental abruption, preterm rupture of membranes, premature delivery, sudden infant death syndrome, low birth weight, childhood growth delay, hyperkinesis, and impaired cognitive development. Obstetricians should be knowledgeable about the health risks of smoking in pregnancy and should be prepared to help the patient quit. An understanding of the difficulties involved in quitting and the chemical dependency associated with smoking is essential. (Auth. Abs. Mod.)

86–1438. Hoff, C.; Wertelecki, W.; Reyes, E., et al. **Maternal Sociomedical Characteristics and Birth Weights of Firstborns.** *Social Science and Medicine* 21(7):775-783, 1985.

Cigarette smoking was a significant risk factor ($p<0.0196$) for intrauterine growth retardation among 1,844 primiparous women (1,461 black and 383 white, 12 to 31 years of age) who received prenatal care. Pregnant women under the age of 17 were considered adolescents. Black adolescents reported a nonsignificantly higher menarcheal age than whites, which (in conjunction with the slightly younger chronological age of the black women) contributed to a significantly lower mean gynecological age for blacks ($p<0.002$). White women were more frequently married and more likely to live with their husbands than with their parents; black women were better educated and more interested in further education. Number of prenatal visits was least frequent among adolescent blacks. There were no differences in contraceptive use between black and white women. Except for a higher incidence of vaginal infection among blacks, there were no significant differences in general health status. White adolescents smoked significantly more than blacks: 28.4 vs. 13.4 percent smoked <10 cigarettes/day; 28.3 vs. 3.7 percent smoked ≥ 10 cigarettes/day. Among adult women the proportions were 26.4 vs. 18.5 percent and 22.6 vs. 4.7 percent, respectively. Results indicate that number of prenatal visits ($p<0.0001$) and maternal diabetes ($p<0.0004$) were also significant risks for intrauterine growth retardation. The greater the number of prenatal visits, the less likelihood the woman would deliver a small-for-gestational-age neonate. There were no differences in birth weights between firstborns of black and white adolescents, but adult white women had significantly heavier firstborns than blacks. No differences were found between black and white women in prevalence of low birth weight neonates. (Auth. Abs. Mod.)

86–1439. Hook, E.B.; Cross, P.K. **Cigarette Smoking and Down Syndrome.** *American Journal of Human Genetics* 37(6):1216-1224, November 1985.

Cigarette smoking was negatively associated with Down syndrome in a matched case—control study of 100 mothers of Down syndrome children, 100 mothers of children with other defects (defect controls), and 100 mothers of children with no defects (normal controls). Results also did not support earlier studies that found a positive association of older age and trisomy in spontaneous abortions. Risk ratios for the association of cigarette smoking around time of conception with Down syndrome was 0.58 percent in the case—defect control comparison and 0.56 in the case—normal control comparison. Stratification by alcohol consumption and maternal age did not abolish the negative trend. The risk ratio was lower among mothers of Down syndrome cases who were over 30 years of age than for younger mothers. It is suggested that the negative association may be attributable to the selective effect of smoking on survival or fertilizability of +21 gametes prior to conception or upon survival of +21 conceptuses after fertilization. (Auth. Abs. Mod.)

86–1440. Jendryczko, A.; Drozdz, M.; Magner, K., et al. **Zwiekszone Stezenie Kadmu w Lozysku i Moczu Kobiet Palacych Papierosy. [The Increased Concentration of Cadmium in the Placenta and Urine of Smoking Women.]** *Ginekologia Polska* 56(10):592-596, 1985, Polish.

A single cigarette contains 1 to 3 μg cadmium, a toxic element with a very long half-life in humans. It is therefore considered a risk factor, particularly for pregnant women who smoke. The placentas of 17 smokers and 12 nonsmokers were examined following delivery of healthy newborns. Statistically significant higher concentrations of cadmium were found in placentas of smokers. Cadmium decreases enzyme activity in correlation with the number of cigarettes smoked. Placental N-acetyltransferase activity in smokers is described. (Auth. Abs. Mod.)

86–1441. Luck, W.; Nau, H.; Hansen, R., et al. **Extent of Nicotine and Cotinine Transfer to the Human Fetus, Placenta and Amniotic Fluid of Smoking Mothers.** *Developmental Pharmacology and Therapeutics* 8(6):384-395, 1985.

Nicotine and cotinine concentrations in placental tissue during the first trimester, in amniotic fluid during the second trimester, and in placental tissue and fetal serum at birth were compared with corresponding serum concentrations of smoking mothers. Nicotine concentrations in placentas (range 3.3 to 28 ng/g), amniotic fluid (range 1.5 to 23 ng/mL), and fetal serum (range 0.5 to 25 ng/mL) were all higher than corresponding maternal serum values. The amniotic fluid/maternal vein serum concentration ratio was 1.54 ± 0.27 during weeks 16 through 24 ($n=23$), the umbilical vein serum/maternal vein serum ratio was 1.12 ± 0.30 at birth ($n=26$), and the placental tissue/maternal vein serum ratio was 2.58 ± 1.30 at birth ($n=17$). Significant correlations were found between nicotine concentrations in amniotic fluid and maternal serum ($r=0.88$), fetal and maternal serum levels ($r=0.88$), and placental and maternal serum levels ($r=0.52$). Cotinine concentrations in placental tissue (range 10 to 131 ng/g), amniotic fluid (range 5 to 188 ng/mL), and fetal serum (range 15 to 233 ng/mL) were lower than or similar to corresponding maternal serum levels. Results indicate that the fetus of a smoker is exposed to higher nicotine concentrations than the mother. (Auth. Abs. Mod.)

86–1442. Marshall, L.B. **Substance Use in Pregnancy Among Two Groups of Urban Women in Papua New Guinea.** *Papua New Guinea Medical Journal* 28(3):195-204, September 1985.

Data on psychoactive substance use (i.e., areca and betel chewing, tobacco, alcohol, and caffeine consumption) among pregnant women in Papua New Guinea indicated that caffeine was the most acceptable and cigarettes the least acceptable.

According to self-reports of 47 pregnant women (8 smokers) between 16 and 35 years of age, cigarette smoking was generally disapproved by all the women and most smokers and alcohol drinkers decreased consumption during pregnancy. The smokers consumed from a few cigarettes/day to 20 to 40 cigarettes/day. All the women consumed at least one cup of coffee or tea each week and five women reported chewing betel quid (the second most commonly used drug). Betel was the drug most commonly used with caffeine. Use of other drugs in combination with betel nut was directly correlated with (1) areas of residence (i.e., city, coast, or highlands); (2) experience abroad; (3) religious persuasion; (4) wage-earning experience; and (5) length of breaks in schooling. Betel chewing (without lime) was deemed appropriate. Coffee or tea was approved if taken with milk, and beer and wine were considered suitable substitutes for hard liquor.

86-1443. Schell, L.M.; Hodges, D.C. **Variation in Size at Birth and Cigarette Smoking During Pregnancy.** *American Journal of Physical Anthropology* 68(4):549-554, December 1985.

Cigarette smoking was strongly associated with size at birth, an influence that occurred without influencing length of gestation, in a study of 458 births to 227 mothers between 1958 and 1978. More than half of the mothers reported not smoking. Of those who reported smoking during pregnancy, 38 percent consumed < 10 cigarettes/day and 43 percent between 11 and 20 cigarettes/day (average 17 cigarettes/day). Median age of mothers at delivery was 25.5 years; median parity was 1.9. The negative association between smoking and birth weight accounted for 21 percent of variance. Birth length was also negatively, but less strongly, associated with cigarette smoking. Reduction in birth lengths can be attributed to reduction in birth weights. Analysis of collinearity between smoking status and other independent variables indicated that the effect of smoking appears to be independent of interrelationships among independent variables. One implication for anthropologists is that variation in human growth patterns is the product of behaviors that are usually regarded as cultural. From an applied anthropology point of view, this means that such influences are enmeshed in a fabric of values, beliefs, and behaviors and does not necessarily mean that such influences are transient or easily modified.

86-1444. Valente, C.M.; Sobal, J.; Muncie, H.L., Jr., et al. **Behavioral Risks and Pregnancy Outcome: Attitudes and Practices of OB/GYNS.** *Maryland Medical Journal* 34(10):1003-1005, October 1985.

Of 1,040 obstetricians surveyed, 96 percent believed that attempts at behavioral modification should be made to reduce the risks of pregnancy, and considered the following actions as "very" or "somewhat" important: eliminate cigarette smoking (99 percent); avoid excess calories (98 percent); eat a balanced diet (96 percent); drink alcohol moderately (85 percent); and avoid alcohol completely (43 percent). Approximately 70 percent reported they were prepared to counsel patients regarding smoking cessation; however, responses indicated that most did not perceive themselves as overly successful in helping patients change behavior. Only 2.9 percent described themselves as "very successful," and 51.6 percent felt that they had been "successful." Another 12.3 to 16.9 percent felt they could be more successful if appropriate support was available, including (1) information on where to refer patients (94 percent); (2) literature for distribution to patients (90 percent); (3) preprinted risk factor questionnaires (86 percent); (4) physician education in specific subjects (82 percent); (5) training for support staff (81 percent); (6) videotapes (80 percent); (7) physician education in behavior modification (76 percent); (8) financial reimbursement for hiring additional staff (74 percent); and (9) financial reimbursement for time spent with patients (68 percent).

86-1445. White, E.; Shy, K.K.; Daling, J.R., et al. **Maternal Smoking and Infant Respiratory Distress Syndrome.** *Obstetrics and Gynecology* 67(3):365-370, March 1986.

An apparent beneficial effect of maternal smoking on infant respiratory distress syndrome (RDS) was investigated in 550 premature infants (≤ 36 weeks) born between 1977 and 1980. Forty-five percent of mothers ($n=249$) were smokers. To avoid bias owing to reduced birth weight of infants of smokers, infants of smokers and nonsmokers were compared within small gestational age categories (2 week intervals) and by birth weight categories. Infants of smokers had reduced incidence of RDS for their gestation compared with infants of nonsmokers. Probability of RDS (adjusted for gestational age and method of delivery) was 25 percent for infants of smokers vs. 38 percent for infants of nonsmokers ($p=.005$), equivalent to approximately a 1.5-week acceleration in lung maturity for infants of smokers. The smoking effect was not explained by demographic differences between smokers and nonsmokers, nor by differences in incidence of pregnancy complications. Results support the theory that adverse pregnancy conditions may lead to an acceleration in pulmonary maturity to allow earlier extrauterine adaptation. (Auth. Abs. Mod.)

86-1446. Wikstrom, G. **Kan Vi Tillata att Foster Roker? [Can We Allow Fetuses to Smoke?]** *Lakartidningen* 83(1/2):32, 1986, Swedish.

The first 10 years of the Swedish Social Ministry's 25-year program to make every environment as smoke free as possible for children born during or after 1975 is evaluated. Almost half of all pregnant women smoke; some reduce consumption during pregnancy, but few quit. In addition, there are smokers in the homes of more than 60 percent of children. The number of smokers is highest among young women, including those in health care professions. At the Huddinge Hospital, 57 percent of women workers aged 18 to 24 years were daily smokers. Effects of smoking during pregnancy include an approximate 200 g decrease in birth weight, increased risk of miscarriage and fetal and neonatal deaths, placental problems, and congenital malformations. Carbon monoxide levels in fetal blood are almost twice as high as in maternal blood and lead to neonatal respiratory problems. Information about the health hazards of smoking during pregnancy appears to vary among maternity centers and often depends on the knowledge of the staff. It is suggested that (1) all health care personnel become better educated about the dangers of smoking, (2) birth control centers refrain from giving birth control pills to smokers, and (3) physicians inform schoolchildren about the health hazards of smoking.

OTHER DISEASES AND CONDITIONS

86–1447. Araki, S. **The Factors Affecting Gastric and Duodenal Ulcers in Japanese Factory Workers.** *Japanese Journal of Industrial Health* 27(4):242-247, July 1985.

Smoking, family history of ulcers in first and second degree relatives, and eating at irregular intervals were major risk factors for gastric ulcer among Japanese factory workers in a case—control study of 74 men with active and inactive ulcers and 74 controls. Patients were found by mass surveys for gastrointestinal disease over a period of 4 years at a plastics processing factory. Controls (workers at the same factory who did not have ulcers) were matched by sex, age, type of work, and job position. Smoking was associated with gastric but not with duodenal ulcer. Smokers among the 63 workers with gastric ulcers smoked significantly more tobacco (mean 20 cigarettes/day) than control smokers. Results suggest that the risk factors for gastric ulcer are not necessarily identical to those for duodenal ulcer. Gastric mucosa appears to be affected by pepsin 1 more directly than duodenal mucosa, and gastric damage is increased by refluxed jejunal contents. The suggestion that psychosocial factors such as frustration at work and in the family might play an important role in development of ulcers was not substantiated. Workers were advised to refrain from smoking and to maintain regular eating intervals to aid recovery and to prevent gastric and duodenal ulcers. (Auth. Abs. Mod.)

86–1448. Battaglia, G.; Farini, R.; DiMario, F., et al. **Is Maximal Acid Output Useful in Identifying Relapsing Duodenal Ulcer Patients?** *Journal of Clinical Gastroenterology* 7(5):375-378, October 1985.

Relapse was more frequent among 18 male duodenal ulcer patients (12 heavy smokers) with maximal acid output (MAO) of >60 mmol/hour than among 58 male and 18 female patients with lower MAO (72.2 vs. 27.6 percent, $p<0.0005$). Patients with MAO >60 mmol/hour, who were treated with maintenance doses of antisecretory drugs (cimetidine, ranitidine, pirenzepine), also had significantly higher relapse rates ($p<0.025$). All 94 patients had endoscopically proved active duodenal ulcer and fasting serum gastrin levels within normal range (25 to 65 pg/mL). At 1 year followup, 34 patients had relapsed: 12 (2 asymptomatic) who were taking antisecretory drugs and 22 (6 asymptomatic) who were untreated. Cigarette smoking has been found to increase both basal and stimulated gastric acid secretion and to impair therapeutic gastric acid inhibition. Although still open to debate, these considerations may explain the association between clinical and functional parameters characterizing duodenal ulcer patients and high relapse rates after healing. It has yet to be proved whether stopping smoking would substantially modify the importance of elevated MAO or whether an alternative therapeutic regime might be proposed for these patients. (Auth. Abs. Mod.)

86–1449. Bharucha, N.E.; Stokes, L.; Schoenberg, B.S., et al. **A Case-Control Study of Twin Pairs Discordant for Parkinson's Disease: A Search for Environmental Risk Factors.** *Neurology* 36(2):284-288, February 1986.

Less cigarette smoking by Parkinson's disease (PD) patients was the only statistically significant result obtained from a telephone survey of 31 monozygotic (MZ) twin pairs discordant for PD ($p<0.05$), undertaken to identify possible environmental determinants of PD while maximally controlling for hereditary factors. Previous studies have suggested that genetic factors play a minor role in PD etiology. The estimated relative risk (RR) for PD among smokers was 0.4. Thirteen dizygotic (DZ) discordant twin pairs were evaluated with the same techniques, but no statistically significant differences were observed between affected and unaffected twins. When MZ and like-sex DZ pairs were combined, there was significantly less cigarette smoking before onset of PD among cases than among controls ($p<0.05$, RR 0.4). Also, significantly less early cigarette smoking (until age 30) was observed in PD patients compared with controls in the combined group ($p<0.05$, RR 0.4). Possible factors explaining the inverse relationship between smoking and PD are discussed. (Auth. Abs. Mod.)

86–1450. Cramer, D.W.; Wilson, E.; Stillman, R.J., et al. **The Relation of Endometriosis to Menstrual Characteristics, Smoking, and Exercise.** *Journal of the American Medical Association* 255(14):1904-1908, April 1986.

Among 268 women with primary infertility as a result of endometriosis, heavy smokers (≥ 20 cigarettes/day) who had started smoking before the age of 17 years had decreased risk of endometriosis. Menstrual characteristics and constitutional factors of the women were studied and compared with those of 3,794 women admitted for delivery from 1981 to 1983. After adjusting for confounding factors (including location, age, religion, and education), the risk for endometriosis for women with short cycles (≤ 27 days) and longer flow (≥ 1 week) was more than double that of women with longer cycles and shorter duration of flow. Increasing risk of endometriosis was associated with increasing menstrual pain. After adjusting for menstrual characteristics, decreased risk for endometriosis was also associated with exercise, particularly strenuous exercise. It is concluded that risk of endometriosis may relate to menstrual factors that predispose to greater pelvic contamination with menstrual products and to constitutional factors that influence endogenous hormonal levels. (Auth. Abs. Mod.)

86–1451. Daling, J.R.; Sherman, K.J.; Weiss, N.S. **Risk Factors for Condyloma Acuminatum in Women.** *Journal of the American Venereal Disease Association* 13(1):16-18, January-March 1986.

In a case—control study of 49 women with a history of condyloma acuminatum (genital warts) and 196 age-matched controls, the risk of developing condyloma for women who had ever smoked was 3.7 times that of never smokers. Furthermore, for women who had smoked for 3 or more years, relative risk was 4.2 compared with 2.4 for those who had smoked for less than 3 years. Relative risk associated with long-term use of oral contraceptives was 9.8. Condyloma acuminatum is caused by infection with human papilloma virus (HPV, usually type 6 or 11), and infection with HPV (usually other types) is associated with increased risk of cervical neoplasia. Thus, if smoking and oral contraceptive use increase the risk of infection with these other types of HPV as they do with types 6 and 11, this factor could be the means by which smoking and long-term use of oral contraceptives increase the incidence of cervical neoplasia. (Auth. Abs. Mod.)

86–1452. Davies, R.; Saha, S. **Osteoporosis.** *American Family Physician* 32(5):107-114, November 1985.

Smoking is one of several risk factors for osteoporosis, a bone disorder characterized by a decrease in bone mass, producing porosity and fragility. From 25 to 30 percent of white women develop symptomatic osteoporosis. Prevention involves modification of multiple factors associated with the disease, such as smoking, inadequate calcium intake, lack of exercise, postmenopausal estrogen loss, and excessive alcohol consumption. The exact mechanism of osteoporosis at the cellular level is unknown, but it is believed to be the uncoupling of osteoclastic-osteoblastic activity, with osteoclastic activity predominating. At present, two methods are commonly used for accurate measurement of bone mineral content and followup of patients: dual-beam photon absorptiometry and computed tomography. Neutron activation analysis is also available, but a relatively high dose of radiation is required. Prevention, far more successful than treatment, includes (1) increasing minimum daily requirement of calcium; (2) supplementing dietary intake of calcium; and (3) replacing estrogen in oophorectomized and postmenopausal women. Cessation of smoking is a beneficial prevention measure, as are a diet rich in calcium and low in protein and phosphate, increased exercise, and reduced alcohol consumption.

86–1453. Fletcher, D.R.; Shulkes, A.; Hardy, K.J. **The Effect of Cigarette Smoking on Gastric Acid Secretion and Gastric Mucosal Blood Flow in Man.** *Australian and New Zealand Journal of Medicine* 15(4):417-420, August 1985.

Possible mechanisms for the effect of smoking on peptic ulcer (higher incidence and delayed healing) include increased gastric acid secretion, reduced gastric mucosal blood flow, and reduced duodenal bicarbonate production. The effect of 1 hour of smoking on gastric mucosal blood flow (^{14}C-aminopyrine clearance), acid secretion (triple lumen perfused oro-gastric tube), and plasma levels of gastrin and pancreatic polypeptide was determined in six chronic smokers (three women). Smoking reduced acid secretion from a median of 433 µmol/min to 166 µmol/min ($p < 0.05$) and blood flow from a median of 66 mL/min to 36 mL/min ($p < 0.05$). There was no change in plasma gastrin. The small rise in pancreatic polypeptide was considered insufficient to affect duodenal bicarbonate production. It is concluded that smoking decreased gastric acid secretion and gastric mucosal blood flow and that the increased incidence of gastric ulcers in smokers may be related to the reduction in gastric mucosal blood flow. (Auth. Abs. Mod.)

86–1454. Gugler, R.; Jensen, J.C.; Rohner, H.G., et al. **Factors Predicting the Therapeutic Outcome of Duodenal Ulcer Treatment With H_2-Receptor Antagonists.** *Klinische Wochenschrift* 63(22):1152-1159, November 1985.

In a prospective trial of 37 duodenal ulcer patients treated daily with 1 g cimetidine, data showed that 12 of 13 nonresponders were smokers compared with 16 of 24 responders ($p < 0.05$), and that more nonresponders had a history of peptic ulcer ($p < 0.01$) and of previous treatment with H_2-receptor antagonists ($p < 0.05$), mostly cimetidine. The 24 responders healed after 4 weeks of treatment. Basal acid output (BAO) and peak acid output (PAO) values did not differ between responders and nonresponders, nor did reduction of BAO and PAO under cimetidine. However, more responders than nonresponders had complete suppression of BAO ($p < 0.05$). In both groups, a correlation existed between cimetidine plasma concentration and PAO, but not with BAO suppression. Regular drug intake (compliance) was about 90 percent in both groups. Cimetidine bioavailability parameters were identical in both groups, but nonresponders had higher peak concentration and shorter time of peak concentration. Using time of peak concentration of cimetidine, previous H_2-receptor antagonist treatment, peak concentration, smoking, and alcohol use, discriminant analysis predicted treatment response in 89.2 percent of patients. Prediction of treatment response is increased by use of drug-related variables. (Auth. Abs. Mod.)

86–1455. Hull, D.H.; Beale, P.J. **Cigarette Smoking and Duodenal Ulcer.** *Gut* 26(12):1333-1337, December 1985.

Data indicate that continued cigarette smoking does not prevent the effect of cimetidine on ulcer healing; however, smoking does predispose a patient to duodenal ulceration following cessation of cimetidine therapy. The influence of cigarette smoking on duodenal ulcer healing in men was investigated in 70 smokers, aged 19 to 62 years, with duodenal and/or pyloric canal ulceration confirmed by gastroendoscopy. At initial evaluation, all patients were advised to quit smoking and received a 3-month course of cimetidine. After 3 months, 79 percent of patients showed ulcer healing by endoscopy and no difference was observed between those who had or had not stopped smoking. After 6 months, however, 61 percent of smokers compared with 28 percent of ex-smokers had duodenal ulceration ($p < 0.05$). This difference reflected a combination of increased ulcer persistence and ulcer relapse. Neither cimetidine, cigarette smoking, nor ulcer healing appeared to affect the presence of duodenitis or fixed deformity. (Auth. Abs. Mod.)

86–1456. Ippoliti, A.F. **Prognostic Factors in Ulcer Disease: Are They Real, Are They Relevant?** *Journal of Clinical Gastroenterology* 7(5):445-446, October 1985.

In controlled trials of ulcer disease over the past 8 years, male gender, heavy smoking, high rates of acid secretion, and long duration of disease were frequently associated with unfavorable outcome. Based on a review of such trials, the following generalizations can also be made: (1) 80 percent of patients treated with an effective agent heal in 6 to 8 weeks; (2) agents differ in antisecretory potency; (3) despite variations, healing rates are generally uniform, as are failure rates (20 percent); (4) placebo treatment "heals" ulcers in 30 percent of patients; and (5) ulcers recur in two-thirds of ulcer patients within 1 year. In a concurrently published report (*Journal of Clinical Gastroenterology* 7(5):375-378, October 1985), the influence of sex, age, acid secretion, serum pepsinogen concentration, blood grouping, and smoking was examined at 1-year followup. Some patients received a drug with proven efficacy (cimetidine, ranitidine, or pirenzipine), while others received antacids or anticholinergics as needed. Overall recurrence rate was 36 percent in patients treated with H_2 blockers, 27 percent in patients on pirenzipine, and 44 percent in patients on low-dose antacids or anticholinergics. A subgroup of male patients (mostly heavy smokers) with a recurrence rate of 72 percent had maximal acid output of >60 mmol/hour. It is concluded that variables other than treatment can influence the course of ulcer disease in a negative way by delaying healing and speeding recurrence, or in a positive way by enhancing healing even without treatment.

86–1457. Jewett, T.C., Jr. **Peptic Ulcer in Childhood.** *Comprehensive Therapy* 11(12):55-61, December 1985.

Although peptic ulcers in children occur infrequently, they can be triggered by (1) inherited genetic factors; (2) emotional factors; or (3) exogenous factors such as cigarette smoking and alcohol, caffeine, or aspirin consumption. There is evidence that inheritance and possibly genetic factors play a role in the strong familial predilection to ulcer disease: between 40 to 50 percent of children with ulcers have a parent with peptic ulcer. Secondary ulcer disease can result from infection or birth trauma in a neonate, infection in a burn patient, and from other causes. Smoking decreases pancreatic secretion and duodenal alkalinity resulting in higher acid values in the duodenum, while alcohol stimulates the production of hydrochloric acid. Children and adolescents who smoke, or who smoke and drink, are thus more susceptible to developing an ulcer. Caffeine and aspirin may also be causative factors, since they have a direct affect on gastric mucosa. The advent of H_2 blockers such as cimetidine has facilitated medical management of peptic ulcer in children.

86–1458. McCready, D.R.; Clark, L.; Cohen, M.M. **Cigarette Smoking Reduces Human Gastric Luminal Prostaglandin E_2.** *Gut* 26(11):1192-1196, November 1985.

Smoking three cigarettes reduced prostaglandin E_2 (PGE_2) in gastric lumen of five male and two female smokers (10 to 25 cigarettes/day) aged 21 to 32 years, which may explain why smoking is a risk factor for peptic ulcer. In addition, the volume of juice was significantly reduced: from 76.1±4.4 mL/15 min before smoking to 54.1±4.6 mL/15 min after smoking, but recovered slightly in the postsmoking period. PGE_2 output declined from an average baseline value of 22.8±4.9 ng/15 min to 12.2±3.8 ng/15 min during smoking, and increased to 17.9±3.0 ng/15 min in the postsmoking period. Cigarette smoking caused the expected increases in pulse rate, blood pressure, plasma glucose, and carboxyhemoglobin. Plasma glucose increased from 4.93±0.07 before smoking to 5.12±0.06 during smoking and to 5.31±0.10 mmol/L in the postsmoking period. Carboxyhemoglobin increased from 0.45±0.10 before smoking to 0.61±0.13 and 0.59±0.11 during smoking and after smoking, respectively. No significant changes were observed during smoking of sham cigarettes. (Auth. Abs. Mod.)

86–1459. Osterberg, T. **Variation in Dental State in Elderly in Gothenburg.** *Swedish Dental Journal* 28:11-17, 1985.

Odontological investigations of people over 70 years of age in Sweden revealed that dental diseases and subsequent loss of teeth were more common among smokers and ex-smokers than among nonsmokers: 46 percent of 545 men who smoked were edentulous compared with only 19 percent of nonsmokers. Amount of smoking was strongly related to dental state, and results indicate that smoking is a risk factor acting independently of socioeconomic, medical, and dietary risks. Dental status, oral mucosa, salivary secretion, and mandibular dysfunction were examined in 1,600 70-year-olds studied at 5-year intervals. Examinations of the first cohort of 400 persons revealed 46 percent of men were edentulous in both jaws and 20 percent in one jaw. In the second cohort of 400 persons, 34 percent were edentulous in both jaws, and in the third cohort (800 persons), only 26 percent were edentulous in both jaws. In women, 55 percent of the first, 42 percent in the second, and 37 percent in the third cohort were edentulous in both jaws. Prevalence of toothlessness had diminished over 10 years from 52 to 32 percent. Only 6 percent of 70-year-olds had severe periodontal breakdown. It is concluded that factors other than aging contribute directly and indirectly to the high prevalence of total and partial dental invalidity in elderly populations.

86–1460. Parente, F.; Lazzaroni, M.; Sangaletti, O., et al. **Cigarette Smoking, Gastric Acid Secretion, and Serum Pepsinogen I Concentrations in Duodenal Ulcer Patients.** *Gut* 26(12):1327-1332, December 1985.

Basal gastric secretory response to acute cigarette smoking and the effects of chronic smoking on gastric secretory capacity, as expressed by pentagastrin-stimulated gastric acid secretion and fasting serum pepsinogen 1 (PG 1) concentrations, were investigated in patients with active duodenal ulcer or nonulcer dyspepsia. In 10 smokers with duodenal ulcer, smoking four cigarettes during 40 minutes did not influence basal gastric secretion of acid and pepsin or serum PG 1 and gastrin concentrations. In 136 patients with duodenal ulcer and 90 controls with nonulcer dyspepsia, pentagastrin stimulated acid secretion and fasting serum PG 1 concentrations were significantly higher among habitual heavy smokers than among nonsmokers. Findings suggest that in heavy smokers with duodenal ulcer, acid- and pepsin-secreting cell function is not affected by acute cigarette smoking. By contrast, chronic cigarette smoking seems to be associated either with an increase of parietal- or chief-cell mass or with an enhancement of their secretory capacity. (Auth. Abs. Mod.)

86–1461. Preber, H.; Bergstrom, J. **Occurrence of Gingival Bleeding in Smoker and Nonsmoker Patients.** *Acta Odontologica Scandinavica* 43(5):315-320, October 1985.

Results showed that despite greater plaque index ($p<0.05$), smokers bled less (27 percent) than nonsmokers (40 percent, $p<0.05$) under probing at standardized pressure of 60 g, indicating that clinical signs of gingival inflammation may be less conspicuous in smokers. Greater bleeding was related to pathological sites or to plaque sites in both smokers and nonsmokers, correlating with results of other studies. However, the low bleeding tendency in smokers became accentuated in the presence of other clinical signs of gingival pathology among 20 patients (10 smokers) with moderate to severe periodontitis. Smokers had smoked for an average of ≤ 15 years and reported average consumption of ≥ 20 cigarettes/day. There were no statistical differences between smokers and nonsmokers with regard to number of teeth remaining, number of pockets with pathological probing depth, and mean probing depth. It is suggested that reduced gingival bleeding in smokers may be the result of vasoconstrictive components in cigarette smoke caused by nicotine.

86–1462. Saumet, J.L.; Dittmar, A. **Heat Loss and Anticipatory Finger Vasoconstriction Induced by a Smoking of a Single Cigarette.** *Physiology and Behavior* 35(2):229-232, August 1985.

Anticipatory finger vasoconstriction in response to the sight of a cigarette may represent a Pavlovian condition that occurs only in heavy smokers. On the basis of self-evaluation, 13 men and 2 women were divided into (1) 4 heavy smokers (10 to 20 cigarettes/day); (2) 5 light smokers (1 to 5 cigarettes/day); and (3) 6 nonsmokers (less than 2 cigarettes/month). All participants smoked French cigarettes (Gitane) with grey tobacco (1.46 mg nicotine/cigarette). Finger pulse amplitude was recorded using a plethysmographic mercury gauge before, during, and after cigarette smoking. Finger heat loss was evaluated using direct calorimetry before and after smoking. Heavy smokers showed a decrease of finger pulse amplitude at the sight of a cigarette and before the first puff. Finger pulse amplitude in light smokers decreased during cigarette smoking. Finger heat loss decreased after smoking in both heavy and light smokers. There was no change in nonsmokers either in finger heat loss or in finger pulse amplitude. (Auth. Abs. Mod.)

86–1463. Sult, S.C. **The Effects of Cigarette Smoking on Perception of Electrical Stimulation and Cold Pressor Pain.** Doctoral Dissertation, University of Mississippi, University Microfilms International 85-14467, 1985, 128 pp.

Cigarette smoking did not affect subsequent ratings on the three response measures for the cold pressor or the electrical stimulation task. The effects of cigarette smoking on the two pain tasks were assessed by (1) pain threshold, (2) pain tolerance level, and (3) McGill Pain Questionnaire scores. The data, in conjunction with previous research, indicate several tentative conclusions: (1) deprived smokers do not appear to evidence significant differences in responsivity to pain when compared with nonsmokers; (2) cigarette smoking may lead to physiological changes (e.g., norepinephrine and/or β-endorphin release or increased cortical arousal) that increase pain threshold if initial blood nicotine levels are high; (3) cigarette smoking seems to cause elevation of pain tolerance if the smoking and pain procedures coincide temporally and if initial nicotine blood levels are high; and (4) stress of the experimental setting may lead to an increased urge to smoke if experimental sessions are conducted subsequent to stabilization of urine acidity and/or if the subject is not nicotine deprived. (Auth. Abs. Mod.)

86–1464. Szymanski, Z.; Marlicz, K.; Birkenfeld, B., et al. **Porownanie Przebiegu Klinicznego i Czynnosci Wydzielniczej Zoladka u Chorych z Wrzodem Trawiennym Palacych i Niepalacych. [A Comparison of the Clinical Course and Secretory Gastric Activity in Smoking and Non-Smoking Peptic Ulcer Patients.]** *Wiadomosci Lekarskie* 38(14):1001-1004, July 15, 1985, Polish.

The effects of smoking on the secretory activity of the stomach and on the clinical course of peptic ulcer were assessed in 502 patients (385 smokers, 117 nonsmokers) with endoscopically and/or radiologically diagnosed gastric or duodenal ulcer. The proportion of complications and surgical interventions was nearly twice as high in smokers as in nonsmokers. Tests of stomach secretory activity in 118 patients with gastric ulcer (95 smokers, 23 nonsmokers) and 194 patients with duodenal ulcer (147 smokers, 47 nonsmokers) showed significantly greater basal and maximal output in smokers with gastric or duodenal ulcer. (Auth. Abs. Mod.)

86–1465. Vermeulen, A.; Deslypere, J.P. **Testicular Endocrine Function in the Ageing Male.** *Maturitas* 7(3):273-279, September 1985.

Plasma testosterone (T), apparent free T (AFT), and gonadotropin levels were determined in 71 monks living in a monastery (under identical environmental conditions) and in 300 healthy men living in a semirural suburb of an industrial town to determine if decreases in plasma T in elderly men are inherent to the aging process or are secondary to environmental factors such as stress, smoking, and physical activity. In all age groups, plasma T and AFT concentrations were higher in smokers than in nonsmokers, but the difference was smaller in elderly than in young subjects, the values of ex-smokers lying somewhere in between. Luteinizing hormone levels were similar among all three smoking groups. A highly significant age-dependent decrease in T and AFT levels and an increase in gonadotropin levels was observed among the monks. The nyctohemeral variation in T levels was found to be lower in elderly than in younger men. In the larger group of men, plasma T levels were more sensitive to stress in younger men; neither moderate physical activity, diet, nor residence consistently altered plasma T levels. It is concluded that the age-associated decrease in plasma T levels is inherent to the aging process and that the major cause is at the testicular level, although there is evidence for subtle alterations at the hypothalamo-pituitary level. (Auth. Abs. Mod.)

BEHAVIORAL AND PSYCHOLOGICAL ASPECTS

86–1466. Aitken, P.P.; Leathar, D.S.; O'Hagan, F.J. **Children's Perceptions of Advertisements for Cigarettes.** *Social Science and Medicine* 21(7):785-797, 1985.

Some 12-year-old children and most 14- to 16-year-olds perceive cigarette advertising much as young adults do, according to data collected during discussions about advertising conducted with 247 6- to 16-year-old students from two contrasting socioeconomic sections of Glasgow: an inner-city working class area and a middle-class suburban area. Children were shown 15 advertisements, 5 of which were regular cigarette ads and 1 that advertised holidays but also presented the imagery of a leading brand. All children appeared to have at least a rudimentary understanding of advertising; all primary school groups, except for 6-year-olds in the inner-city area, were able to describe the selling function of advertising, and most inner-city groups listed the same media as their suburban peers. In addition, despite differences in attitudes toward the discussions (suburban students were more articulate and less aggressive than inner-city students), there was a basic similarity in response to the cigarette ads. Brand-stretching, the technique used to associate smoking with the good life, using only the cigarette brand logo, was perceived differently by each age group. However, although 59 percent of 6-year-olds and 46 percent of 8-year-olds perceived only the visual content (racing cars and racing), 10 percent of 8-year-olds said that cigarettes were being advertised. In all, 22 percent of primary school children and 91 percent of secondary school children said that cigarettes were being advertised in some way. Although it is conceded that these results could be useful to cigarette advertisers, it is suggested that the children's perceptions are an important prerequisite for designing effective health education programs that mold attitudes toward smoking. Advertisements with attractive images, ostensibly aimed at adults, are also attractive to children. After Norway banned all cigarette advertising in 1975, the decline in smoking was most noticeable among young people.

86–1467. Andre, E. **La Necessite de Comprendre les Phenomenes de Dependance Pour Une Meilleure Approche de la Prevention. [The Necessity to Understand the Phenomenon of Dependence for the Best Approach to Prevention.]** In: Molimard, R. (Editor). *3ème Journee de la Dependance Tabagique.* Comptes Rendus, U.E.R. Biomedicale des Saints-Peres, Paris, June 1985, pp. 20-23, French.

A discussion of the phenomenon of tobacco dependence includes (1) why a smoker becomes tobacco dependent; (2) the most comfortable time to stop smoking; (3) whether tobacco satisfies some deep need; and (4) what causes the physiological and psychological suffering endured by the smoker who quits. Until there are some answers on the "why" of tobacco dependency, physicians have an important role in explaining the problems of dependency to patients. Unfortunately, smokers are seeking a miracle drug to help them quit smoking, and one does not exist. Studies are needed to find means for (1) suppressing deprivation feelings that emerge with tobacco withdrawal, and (2) analyzing individuals at risk for possible psychological and pharmacological treatment. More research is needed to delve into the different feelings that accompany ingestion of nicotine, i.e., tranquilizing, stimulating, relaxing, and pleasure-producing sensations. It is suggested that depression, and other deprivation effects, may be explained biochemically as neurohormonal secretions or some other manifestations that occur with cessation of smoking.

86–1468. Baragiola, A.M. **Tabaquismo en Establecimientos Educacionales. [Tobaccism in Educational Establishments.]** Mendoza, Argentina, Ministerio de Cultura y Educacion, Consejo Nacional de Educacion Tecnica, Escuela Nacional de Educacion Tecnica No. 5, 1985, 21 pp., Spanish.

A new classification scheme for describing tobacco use, based on guidelines from several sources including the World Health Organization and the Panamerican Health Organization, is described. The proposed scheme includes three classifications that emphasize (1) the nontherapeutic use of tobacco to the detriment of the user's health, with or without evidence of dependence, and including a history of difficulty in trying to quit; (2) organic hallucinatory psychoses resulting from tobacco effects on the circulatory and respiratory systems; and (3) self-medication with tobacco for its sensory, calming, or appetite suppressing qualities. Using several tests of smoking behavior, a tobacco use survey was conducted on 85 smokers among students and faculty of the National School of Technical Education No. 5. Information collected on smoking behaviors, attitudes, and motivations revealed a contradiction between level of desire to quit smoking and past difficulty in doing so. It is suggested that, in addition to publicizing the hazards of smoking, more media attention should be directed toward providing information on how to quit smoking. A proposed format for a large-scale study includes a section that would focus on general health characteristics other than smoking, including use of alcohol or drugs, nutrition, exercise and physical condition, control of nervous tension, and sense of personal security.

86–1469. Baragiola, A.M. **Investigacion del Tabaquismo en Alumnos de Escuelas Secundarias. [Investigation of Tobaccism in Students of Secondary Schools.]** *Revista de Neuropsiquiatria Daimon* 19/20:34-36, 1985, Spanish.

The survey questionnaire used to investigate smoking prevalence and psychosocial aspects in secondary school students in Argentina contained 18 questions (5 possible responses each) from which six categories of smoking motivation were formulated. The categories include stimulation, manipulation, pleasurable relationship, tension reduction, desire (psychological addiction), and habit. Scoring varied from 3 to 5 points. Total scores of 11 or more were considered high and scores of 7 or less were considered low. Population parameters, including age, how long the student had smoked, number of cigarettes smoked/day, type of cigarette smoked, smoking habits of family members, and whether or not the subject ever considered quitting, were also collected and correlated with test results. The method was simple, economical, and rapid, providing results in 3 hours. Final data were also amenable to statistical analyses.

86–1470. Becker, C.; Eichelberger, B.J.; Small, A. **Statewide Health Survey Reveals Risky Behavior.** *Pennsylvania Medicine* 89(2):60-62, February 1986.

Half of all premature mortality in the United States attributable to smoking, alcohol and drug misuse, improper diets, physical inactivity, stress, and failure to adhere to safety rules are preventable through behavior modification. A random sample of 904 adults aged 18 to 64 surveyed by the Pennsylvania Department of Health to assess preventable health risks revealed that (1) one-third of all respondents were cigarette smokers; (2) more young women than men started to smoke and were less likely to quit; (3) half of the men who ever smoked had quit compared with only 30 percent of the women; (4) two out of five women of childbearing age (18 to 44 years) were smokers, risking stillbirths, spontaneous abortions, and low birth weight infants; and (5) only 40 percent of pregnant women had received advice from a physician about stopping smoking. It is estimated that if only 5 percent of smokers quit on advice of physicians, there would be 100,000 fewer adult smokers in Pennsylvania by 1988. The decline in smoking and reduced consumption of saturated fats and cholesterol over the last decades indicate that adults can modify unhealthy lifestyles. Results emphasize the continued need for health education, particularly by physicians, who can play an important role by educating patients or by referring them to reputable community health education and risk reduction programs.

86–1471. Bolla, P.A. **The Effects of Environmental Supports and Gender on Smoking.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 337-339.

Social support for smoking (the presence of another smoker) affected smoking behavior among 72 adult smokers (42 women) in white-collar positions who were exposed to four conditions: (1) no ashtray and nonsmoker model; (2) no ashtray and smoker model; (3) ashtray and nonsmoker model; and (4) ashtray and smoker model. Multivariate analyses of variance revealed significant main effects for model and sex factors. When the model smoked, subjects smoked more cigarettes, puffed more frequently, took shorter intervals between cigarettes, and began to smoke earlier than when the model refrained from smoking ($p<0.001$). Women smoked more cigarettes, puffed more frequently, spent a shorter duration smoking each cigarette, and began to smoke earlier than men ($p<0.01$). Social environment is thus an important influence on adult smoking rate and topography. Results failed to indicate that the presence or absence of ashtrays significantly influenced smoking. It is concluded that smoking prevention and intervention programs need to include techniques to counteract subtle influences of the social environment.

86–1472. Cameron, D.; Jones, I.G. **An Epidemiological and Sociological Analysis of the Use of Alcohol, Tobacco and Other Drugs of Solace.** *Community Medicine* 7(1):18-29, February 1985.

To emphasize the need of sociological theory in epidemiology, the association between smoking (and other drugs of solace) and disease is examined by investigating the processes by which society exerts its influences on its members in the production of disease and disability. It is hypothesized that unhealthy forms of behavior, including smoking, obesity, and alcohol abuse, are not free choices of the individuals concerned, but are brought about by needs created by society. Society not only needs tobacco, alcohol, and other drugs of solace to relieve the pain and suffering of individuals, but could not function in its present form without them. The underlying causes of the medical conditions associated with use (e.g., addiction and dependence) are twofold: those that are due to direct material causes and those in which the material causes act indirectly through ideology. Prevention of the conditions that contribute to the use of drugs of solace requires immediate action, which will not be truly effective unless we consider what it is in our society that creates a need for these drugs and unless whatever actiona are initiated take into account the effects of all the drugs.

86–1473. Chetwynd, J. **Some Characteristics of Women Smokers.** *New Zealand Medical Journal* 99(794):14-17, January 1986.

Among 978 New Zealand women aged 18 to 60 years, the 339 smokers were more likely to (1) have come from a blue-collar occupational background, (2) report family problems and depressive symptoms, (3) make excessive use of other dependency type substances, and (4) have mothers or partners who smoke. The proportion of smokers by age was 45.4 percent of those aged 18 to 26 years, 33.0 percent of women aged 27 to 36 years, and 25.8 percent of those aged 37 to 60 years. Among smokers, 58 percent had partners who smoked and 31 percent had mothers who smoked. Marital, sexual, or financial problems were more prevalent among smokers in the 3 years prior to the study, as were general ratings of unhappiness in childhood or adulthood. Smokers had a significantly higher mean score (3.6) than nonsmokers (2.7) on the Beck depression scale. More smokers than nonsmokers were heavy consumers of tea or coffee (>10 cups/day) and sugar (>10 teaspoons/day), and daily alcohol consumption was higher among smokers than nonsmokers. Heavy use of alcohol was more prevalent among young smokers, whereas consumption of caffeine and sugar were more frequently associated with older smokers (aged 27 to 36 years). The women surveyed were primarily engaged in home-based housework and childcare, or were employed part-time (<20 hours/week) outside the home; 95 percent were of European extraction, 72 percent were living in a permanent relationship, and 75 percent had at least one child.

86–1474. Collishaw, N.E. **Is Cigarette Consumption Declining in Canada?** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 667-677.

Data collected at regular intervals since 1965 by the Smoking Habits of Canadians Survey on smoking behavior have underestimated both the number of cigarette smokers and total consumption of cigarettes. The most serious underestimation occurred from 1975 to 1981. Adjusted data revealed that the number of men who smoke has been decreasing and the number of women who smoke has been increasing. However, smokers represent a declining fraction of the total adult population. Per capita consumption remained constant at about 10.5 cigarettes/day, but cigarette sales increased at a rate of nearly 2 percent/year, and consumption increased from 24 cigarettes/day in 1975 to 27 cigarettes/day in 1981. It must, therefore, be concluded that cigarette consumption increased over the period studied. Weight of tobacco consumed each day/smoker increased modestly and declines occurred in average daily consumption of tar, as derived from trends in sales-weighted averages of declared tar yields. However, more information on the compensatory behavior of the smoking population is needed to interpret this latter trend. (Auth. Abs. Mod.)

86–1475. Conley, J.G. **The Influence of Social-Cultural Factors on Risk Perception.** Doctoral Dissertation, University of Michigan, Ann Arbor, University Microfilms International 85-12389, 1985, 219 pp.

The hypotheses that individuals will display similar risk perceptions for related issues such as cigarette smoking and coffee and alcohol consumption and that social-cultural factors such as moral judgment, values, locus of control, social support, normative expectations, and pertinent past experience will significantly influence risk perceptions were investigated in a secondary analysis of data collected for a study of health behavior decisionmaking during pregnancy and prenatal care in the Seattle area. The operational models developed for smoking, caffeine, and alcohol performed well in accounting for the variance in risk perceptions of consuming these potentially hazardous substances during pregnancy. Moral judgment was consistently the most important predictor across the three models. In the operational model of smoking, the relative value of pleasure, general social support, level of habituation, knowledge, and moral judgment had statistically significant influences on risk perceptions, with moral judgment of the importance of the consequences of not undertaking the risky behavior having the largest impact of any contributor. Findings demonstrate that broad social and cultural factors play an important role in determining individual risk perceptions. Future studies need to investigate the congruence between risk perceptions and health-related risk-taking behaviors, as well as the direct or indirect effects of social-cultural factors on these behaviors.

86–1476. Cruz, E.; Lisboa, C.; Aguirre, C., et al. **Estudio Longitudinal del Habito de Fumar en Estudiantes de la Universidad Catolica. I. Caracteristicas del Habito en los Ingresos de 1982 a 1984. [Longitudinal Study of the Smoking Habit Among University Students.]** *Medica* 113(12):1231-1239, December 1985, Spanish.

Although the total number of smokers among Chilean university students declined over a 3-year period, data showed that more women were smoking each year. Questionnaire responses from 6,523 students (51.6 percent men) of the Catholic University of Chile (85 percent of cohorts who entered the university in 1982, 1983, 1984) indicated that prevalence of smoking was 38.5 percent, 36.8 percent, and 35.2 percent, respectively, with women having a slight predominance. Over 80 percent of smokers consumed <9 cigarettes/day. Most students started smoking between 14 and 17 years of age (peak age 15 years). The principal recognized factor in smoking initiation was "friends" (over 70 percent), followed by "family." The number of smokers at home and parent's permission to smoke were significant determinants. A significant inverse relationship was observed between results obtained in the Academic Aptitude Test and the percentage of smokers. The number of smokers in the lower third was double the number in the highest third ($p<0.01$). The main differences between the three cohorts was a trend toward purchasing cheaper cigarettes or those with lower tar and nicotine content. (Auth. Abs. Mod.)

86–1477. Department of Health, Government of the Northwest Territories. **Tobacco Use Among Students of the Northwest Territories.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 347-349.

A 1982 survey showed that the number of adolescent smokers in the Northwest Territories (NWT) is among the highest in Canadian schools: 49 percent of boys and 53 percent of girls between 15 and 19 years of age are regular smokers and most began to smoke in elementary school. Prevalence of smoking among the three major ethnic groups (Inuit, Metis, and Indian) was twice that recorded in the national population. The age of smoking onset was lower among girls than among boys, and in all ethnic groups after the age of 10, prevalence of smoking was higher among girls. Approximately 9 percent of NWT schoolchildren chew tobacco or use snuff (mainly boys aged 10 to 14 years). Although smoking is more prevalent among Inuit, Indian, and Metis youth, the frequency of smoking is higher among non-natives, which may reflect differences between the groups in the availablility of cigarettes or in the financial resources to purchase cigarettes. It was also found that (1) prevalence of smoking was highest among Inuit girls (60 percent), and girls are more likely than boys to smoke ≥ 60 cigarettes/week; (2) there were regional differences in prevalence of smoking, probably because of variations in ethnic composition of the student population; (3) age, peer group, sibling, and parental smoking behavior affect behavior of NWT youth; and (4) chewing tobacco appears to be used mainly by boys in the ethnic groups and is often used prior to onset of cigarette smoking. Approximately 95 percent of the students agreed that cigarette smoking causes lung cancer, but knowledge of smoking-related diseases did not appear to be a deterrent to smoking.

86–1478. Dobbs, J.; Marsh, A. **Smoking Among Secondary School Children in 1984.** Department of Health and Social Security, the Welsh Office, and the Scottish Home and Health Department, 1984. London, Her Majesty's Stationery Office, October 1985, 88 pp.

Among 3,658 first- to fifth-form students in England and Wales in 1984, 22 percent were smokers (13 percent regular, 9 percent occasional). In Wales, 11 percent of 2,778 students smoked regularly and 6 percent smoked occasionally. Among 2,798 first to fourth formers in Scotland, 16 percent smoked regularly and 8 percent smoked occasionally. Data were collected from 292 schools in October and November of 1984 during the second national survey of smoking among secondary school children. In England and Wales, consumption by regular smokers averaged 49 cigarettes/week; in Wales, 47 cigarettes/week; and in Scotland, 50 cigarettes/week. It is estimated that pupils in England and Wales smoke between 19.6 million and 26 million cigarettes/week, spending 1.2 to 1.6 million pounds on cigarettes. The estimate for the Welsh component is between 0.9 and 1.3 million cigarettes/week at a cost of 60,000 to 75,000 pounds. Scottish pupils consume between 2.4 and 3.1 million cigarettes/week at a cost of 140,000 and 190,000 pounds. Development of the smoking experience is charted through the grades. Generally, the number of never smokers decreases as the number of years at school increases. By the time students reach the last compulsory year at school, about 75 percent have at least tried smoking a cigarette. Student attitudes toward smoking are also documented.

86–1479. Dobson, A.J.; Hardes, G.R. **Group Effects in Smoking Research: Statistical Considerations.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 679-685.

Statistical sampling of smoking behavior of individuals within the same social group may require subgrouping or clustering to remove the effects of microsocietal differences or lifestyle interventions. Statistical power to detect real differences is lessened because of significant differences between subgroups or clusters; therefore, larger sample sizes are required. Peer group influences within subgroups, for example, may be as important as standard sampling differences related to age, sex, location, and other variables. Two surveys, conducted a year apart, were used to test such clustering effects during a smoking prevention program for 10- to 12-year-old students.

To detect a 5 percent difference in smoking prevalence with an 80 to 90 percent efficiency, sample size calculations indicated 800 children would be needed; however, prevalence rates at baseline differed considerably between schools, attributable to clustering, and the sample size should have been 1,200 to reach the desired level of efficiency. Also, the large increase in smoking among all children over the study period indicated that the smoking adoption rate was a more appropriate measure than the prevalence rate. Variance in smoking prevalence tends to be larger than the crude binomial estimate because of variation between subgroups within the population and within each subgroup.

86-1480. Eide, I. **Smoking and Women's Emancipation; The Developed World.** In: Forbes, W.F.; Frecker, P.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 687-692.

A cross-national study in the United Kingdom, Denmark, Finland, Norway, and Sweden, which compared women's daily smoking with degree of emancipation, found that the proportion of feminists who smoke does not support the concept that the new women's movement is responsible for the increase in smoking among women. Young women who had more than a compulsory education, had a paying job, and were exposed to a wider range of options and activities of urban living were termed "emancipated," to distinguish them from women in the traditional role of housewife. There were fewer daily smokers in the emancipated category and more in the least emancipated group than in the total group. More daily smokers in the emancipated group than in the less emancipated groups have been able to quit smoking, although the least emancipated group contained the most never smokers and the most emancipated group had the fewest never smokers. Fewer daily smokers identified themselves as feminists (one out of eight women) than as nonfeminists, but there were more smokers among those sympathetic to feminist views (job sharing, mother's right to work for pay). More feminists than nonfeminists socialized with nonsmokers, and the feminist milieu was more frequently perceived as having a nonsmoking majority.

86-1481. Fee, W.M.; Briscoe, C.; Crombie, I.K., et al. **Prevalence of Cigarette Smoking in Dundee School Children in 1964 and 1984.** *Community Medicine* 7(4):283-288, 1985.

In 1984, 29 percent of 15-year-old boys in Dundee were smoking compared with 43 percent of a similar group surveyed in 1964, while among girls, the number of smokers remained almost the same (34 vs. 35 percent). Although fewer boys were smoking in 1984, smoking started earlier (11.5 vs. 12.2 years) and consumption was higher (34 vs. 19 cigarettes/week). Average consumption among girls increased from 10 to 25 cigarettes/week. Of 2,494 children enrolled in the 3rd year of 12 secondary schools, 81 completed questionnaires. Current smokers reported that 59 percent of fathers and 54 percent of mothers also smoked. In 1984 (1) 70 percent of boys and 87 percent of girls thought smoking was harmful (compared with 74 and 78 percent, respectively, in 1964); 65 percent did not smoke and considered starting unlikely; and (3) 11 percent of smokers considered stopping unlikely and 20 percent thought they probably would stop. Expiratory carbon monoxide (CO) measurements in 353 pupils indicated that average CO levels in smokers who considered stopping unlikely were 10.8 ppm, while average levels in those who thought they might stop were 6.2 ppm.

86-1482. Feldman, R.B. **The Relationship Between Adolescent Use of Tobacco and Perceived Communication With Parents.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 351-353.

A survey of 673 high school seniors from one predominantly middle-class suburban geographic area showed that students who reported ever using tobacco had significantly lower perceived communication with parents than students who had never used tobacco ($p<0.001$). The significant negative correlation confirmed that lack of communication with parents is a possible risk factor for adolescent tobacco use. Earlier studies have correlated increased adolescent drug use, including cigarettes, with low parental affection, low family affinity, greater life stress centered around the family, unhappy home life, and lack of family affection and closeness. Data from 359 girls and 253 boys about tobacco use showed that 438 (69.9 percent) had experimented with tobacco (77.5 percent of girls and 68.7 percent of boys, $p<0.05$) and 227 (36.2 percent) had used tobacco within the past 30 days (44 percent of girls and 25 percent of boys, $p<0.001$). Approximately 5 percent smoked at least 30 cigarettes/day and 6 percent smoked between 10 and 20 cigarettes/day. Among students who used tobacco, approximately 12 percent had smoked in their parents' presence during the 30 days preceding the survey. There was significantly greater daily use of other psychoactive substances by seniors who used both marijuana and cigarettes in the 30 days prior to the survey than among students who abstained from tobacco and marijuana use or had used only tobacco or marijuana ($p<0.001$). Findings could aid in formulating guidelines to prevent smoking among similar groups, and it is recommended that organized antismoking education be geared to children under the age of 12 years, since the mean age of initial tobacco use in the group surveyed was 12.6 years.

86-1483. Folgero, S.; Brofoss, I.; Lochsen, P.M. **Smoking Habits Among Registered Nurses, Auxiliary Nurses and Nurse Aides.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 693-699.

A 1979 Norwegian survey of 1,129 registered nurses, 529 auxiliary nurses, and 200 nurses aides (84 percent of the total sampled) found that (1) cigarette consumption was higher for the combined group than for women in the general population; (2) average daily consumption was similar for auxiliary nurses and nurses aides and somewhat lower for registered nurses; (3) 22 percent of registered nurses, 31 percent of auxiliary nurses, and 39 percent of nurses aides were daily smokers; (4) more than twice as many nurses aides worked in areas where smoking was not prohibited than did registered and auxiliary nurses; (5) the percentage of daily smokers decreased with increasing age in all three groups; and (6) almost half of all daily smokers had tried to quit in the last 12 months. When smoking habits of registered nurses were compared with other groups, it was found that the percentage of daily smokers was lower among registered nurses than among women in the general population, but higher than among doctors and teachers. The quit rate was higher for registered nurses than for women in general or for the other two nursing groups, but lower than for doctors and teachers. Comparisons are also made with American and British registered nurses.

86–1484. Grossman, M. **Taxation and Cigarette Smoking in the United States.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 483-487.

Increased taxation and the resulting higher prices for cigarettes can have a significant effect on smoking among adolescents, on the basis of data from studies among 12- to 17-year-olds and older consumers (20 to 74 years). Separate estimates are given for the percentage change in smoking participation rate caused by a 1 percent change in price of cigarettes and for the percentage change in number of cigarettes consumed by smokers caused by a 1 percent change in price. A U.S. Health Examination survey of 6,768 adolescents, a U.S. Health Interview survey of 28,033 adults, and National Institute on Drug Abuse surveys indicated that an increase in the Federal excise tax could have a potent effect because adolescents are more responsive to changes in the price of cigarettes than adults and price elasticity of smoking participation is much larger than price elasticity of quantity consumed by smokers. Thus, the tendency of smokers to compensate for a reduction in the number of cigarettes consumed by switching to brands with higher levels of tar and nicotine, inhaling more deeply, or reducing idle burn can be ignored in evaluating impacts of excise tax changes. More important, the large adolescent smoking participation elasticity implies that excise tax changes are very effective tools for preventing the onset of habitual behavior.

86–1485. Gurling, H.M.D.; Grant, S.; Dangl, J. **The Genetic and Cultural Transmission of Alcohol Use, Alcoholism, Cigarette Smoking and Coffee Drinking: A Review and an Example Using a Log Linear Cultural Transmission Model.** *British Journal of Addiction* 80(3):269-279, September 1985.

The simplifying assumptions made by geneticists in the study of behavior are reviewed, and their relation to the genetics of cigarette, alcohol, and coffee use and abuse is explored. The most notable problems are the validity of genetic estimates for substance use based on twin data when within twin pair competition or mutual effects have been shown to be present and the fact that broad secular changes in behaviors such as alcohol consumption render heritability values valid only for certain populations at specific points in time. Behavior genetic methods can, however, provide information about different sources of environmental variation and tend to show that the family is of little importance, especially for personality traits as well as for some aspects of substance use. The twin method has been the main strategy to investigate the behavior genetics of smoking. Study results indicate the great importance that specific environmental effects have on smoking behavior. These effects are assumed to consist of peer influences not shared by other family members or other idiosyncratic sources of stress. To provide an example of a suitable log linear model for cultural transmission of behaviors, coffee consumption data was collected from 221 university students and the dependent variable (personal coffee consumption) was correlated with maternal and paternal coffee consumption (vertical transmission) and with friends' coffee consumption (horizontal transmission).

86–1486. Hay, D.R. **Changes in Smoking Habits Between the 1976 and 1981 New Zealand Population Censuses.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 725-731.

Between the 1976 and 1981 censuses in New Zealand, the number of smokers declined from 40 to less than 35 percent among men and from 32 to 30 percent among women. The number responding to the question on smoking habits was approximately 2.2 million (96.7 percent) in 1976 and 2.3 million (98.8 percent) in 1981. Data showed that (1) the biggest reduction in smoking occurred in those aged 40 years and older, (2) the number of smokers increased and remained highest among those aged 20 to 24 years (40 percent), and (3) the number of smokers among 15- to 19-year-olds remained unchanged (30 percent). Among ethnic groups, 70 percent of Maori women aged 20 to 24 years were regular smokers; however, smoking declined slightly in Maori women over 25 years of age. In contrast, the number of smokers among Maori men fell slightly in all age groups. Pacific island women smoked less than Maori women, but their level of smoking had increased since 1976. Heaviest cigarette consumption was among white-collar workers: 60 percent of men and 50 percent of women exceeded 20 cigarettes/day. Unemployed men (56 percent) and women (52 percent) also smoked heavily. The number of smokers among third, fourth, and fifth form students declined from 43 to 37 percent, but the biggest drop, from 37 to 24 percent, occurred among secondary school students.

86–1487. Hearne, J.T. **Predicting Children's Propensity to Smoke Using Factors Inferred by the Health Belief Model and the Social Network Model.** Doctoral Dissertation, University of Washington, College of Education, Seattle, University Microfilms International 85-08055, 1985, 178 pp.

Two models were tested in an attempt to extend the theoretical framework that indicates that children's smoking behavior can be predicted by some combination of personal factors such as health knowledge and health attitudes, and environmental factors such as family smokers, smoking friends, and experimenting friends. The Health Belief Model, which views the individual as an independent decisionmaker whose attitude regarding health determines his health participation, and the Social Network Model, which views the individual as a product of the environment that is shaped by peer and family attitudes and behavior, were used with 503 students in kindergarten through sixth grade. Students in three suburban school districts (similar in socioeconomic status, ethnic configuration, and student achievement) were exposed to three different curricula, and predictor/criterion relationships between model variables and student smoking attitudes and behavior were determined. Findings show that the decision to smoke is primarily a social act; friends who smoke and friends who experiment make the difference in a student's decision to try cigarettes. Students with positive health attitudes were more likely to have nonexperimenting friends, which suggests that curriculum designs that target health attitudes at an early age create a positive climate for nonexperimentation. Results also indicate that (1) the Social Network Model variables accounted for 17 percent of variance in propensity to smoke, while the Health Belief Model variables accounted for 13 percent; (2) addition of the health knowledge variable to both models did not increase the predictive power of either model; (3) strength of relationships between model variables and propensity to smoke varied according to type of curricula; (4) neither model was sufficient to predict students' propensity to smoke; and (5) neither model consistently explained variations in smoking attitudes and behavior.

86–1488. Hecker, B.L. **Attitudes and Smoking: On Having Half a Mind to Quit.** Doctoral Dissertation, University of Massachusetts, Amherst, University Microfilms International 85-09551, February 1985, 134 pp.

Posttest attitudes predicted intention to quit and intention to quit predicted behavior in an examination of attitudes toward smoking and cessation of smoking among 64 women and 36 men participating in five smoking cessation clinics in Massachusetts. Subjects completed questionnaires on the first and last days of class and were contacted by telephone 1 month after program termination. Factor analyses revealed two subscales within attitude, one affectively oriented and the other cognitively oriented. Items in the emotional attitude factor correlated with beliefs that were garnered through personal experience. The cognitive factor correlated with beliefs acquired secondhand from the media or health professionals. Emotional attitudes were more important than cognitive attitudes in determining intention. It is suggested that smoking cessation intervention programs allot equal time to lowering attitudes toward smoking and improving attitudes toward quitting. In addition, energy must be directed toward methods for targeting emotional attitudes, and facilitators should be sure they are addressing salient beliefs and that the target beliefs have enough variance to warrant an attempt at persuasion. (Auth. Abs. Mod.)

86–1489. Hernandez-Ramos, P.F. **Smoking Behavior: An Investigation of the Theory of Reasoned Action.** Doctoral Dissertation, Stanford University, University Microfilms International 85-06202, 1985, 139 pp.

The theory of reasoned action was applied to the problem of smoking, utilizing data from the Stanford Heart Disease Prevention Program's (SHDPP's) Five City Project. Research questions investigated involve (1) factors that could influence smokers' intentions to quit smoking; (2) effects of SHDPP's communications program on smoker's attitudes toward smoking behavior in the treatment cities; (3) which persons among the smoking population are more likely to stop smoking, to try to quit, or to continue smoking; and (4) changes in the relationship between smoking intentions and smoking behavior over time. Overall support was found for the basic assumption of the theory of reasoned action: smoking behavior may be considered to be under the volitional control of the individual. Analyses indicated that "attitudes toward smoking" and "subjective norms" predict "intention to quit smoking" and that the relative weights of the attitude and subjective norms components differ between treatment and control cities. Additional analysis revealed that the communication program left smokers' confidence in their abilities to quit practically intact, despite the fact that they had learned some skills on how to go about trying to quit. The hypothesis that the influence of resolve on behavior increases over time for smokers in treatment cities was not accepted.

86–1490. Herskovic, J.E.; Rose, J.E.; Jarvik, M.E. **Cigarette Desirability and Nicotine Preference in Smokers.** *Pharmacology, Biochemistry and Behavior* 24(2):171-175, February 1986.

Injections of 4 mg nicotine base into the filter of non-nicotine cigarettes significantly increased their desirability over those injected with 0 or 2 mg nicotine in deprivation studies into the reinforcing properties of nicotine and its role in maintenance of cigarette smoking. Another experiment under three conditions (overnight abstinence, 30 minutes deprivation, and immediately after smoking), to determine nicotine-seeking across a wide range of cigarette deprivation, showed that nicotine preference was greatest after overnight deprivation, least after satiation, and intermediate after 30 minutes deprivation. Nicotine-seeking increased as a function of cigarette deprivation even though higher nicotine puffs were rated harsher, stronger, and less desirable than lower nicotine puffs. Nicotine preference was assessed by allowing the 12 men and 6 women. who had consumed an average of 25.7 cigarettes/day (estimated nicotine delivery 1.0 mg) for an average of 15.6 years, to freely adjust nicotine concentration of each puff using a smoke-mixing device. Results are analogous to findings that intravenous nicotine self-administration continues to occur in some smokers despite drug-induced illness. Results suggest an inverted-U relationship between nicotine content and desirability. (Auth. Abs. Mod.)

86–1491. Jones, A.W. **An Exploratory Study of the Etiology of Cigarette Smoking Among Kindergarten Through Fourth-Grade Schoolchildren.** Doctoral Dissertation, Pennsylvania State University, College of Health, Physical Education, and Recreation, University Microfilms International 85-16123, May 1985, 193 pp.

In an examination of the etiology of cigarette smoking, it was found that 50 percent of 210 kindergarten through fourth grade children had experimented with cigarettes before the age of 6 years. Smoking behavior of mothers, friends, and best friends correlated with experimentation by children, but perceived parental disapproval discouraged others from starting. Fewer experimenters were found in the Pennsylvania (Delaware County) study than in previous prevalence studies. Young children from higher income households were more likely (1) to have tried cigarettes, (2) to have initially experimented in the home, and (3) to state an intention to smoke in the future. None of the children could be classified as regular smokers (one or more cigarettes/week). It is concluded that young children can be interviewed about health-related behaviors before the actions become habitual. It is recommended that (1) tobacco education programs be initiated in kindergarten or first grade; (2) prevention rather than intervention programs be emphasized; (3) family involvement be fostered; (4) tobacco education curricula be developed to emphasize decisionmaking skills; and (5) programs be evaluated periodically for effectiveness.

86–1492. Kunsendorf, R.; Wigner, L. **Smoking and Memory: State-Specific Effects.** *Perceptual and Motor Skills* 61(2):558, October 1985.

Intentional recall was examined in 32 smokers (mean 15.2 cigarettes/day) to determine whether smoking has state-specific effects on memory. Subjects were randomly assigned to four test groups. Each group spent 15 minutes studying a 550-word article on education and, after a 10-minute break, answered six factual questions based on the article. The four treatment conditions were smoking vs. no smoking during the study period, crossed with smoking vs. no smoking during testing. The mean number of correct answers was 4.1 for the eight participants who smoked during both study and testing, 2.6 for the eight who smoked only while studying, 2.9 for the eight who smoked only during testing, and 3.6 for the eight who did not smoke during either activity. Although two-way analysis of variance indicated no main effect of the studying conditions ($F=0.10$) and the testing conditions ($F=0.94$), there was a significant interaction between study conditions and test conditions ($F=8.46$, $p<0.01$). When studying and testing were conducted in the same state (either smoking or no smoking), memory was better than when study and testing were conducted in different states ($F=8.74$, $p<0.01$). (Auth. Abs. Mod.)

86–1493. Kunstadter, P. **Health of Hmong in Thailand: Risk Factors, Morbidity and Mortality in Comparison With Other Ethnic Groups.** *Culture, Medicine and Psychiatry* 9(4):329-351, December 1985.

Low morbidity and mortality among the Hmong of Thailand compared with other highland ethnic groups may be associated with levels of tobacco and alcohol use. Only 27 percent of Hmong men and none of the women ≥ 20 years smoke tobacco, compared with other ethnic groups in which over 83 percent of men and 46 percent of women may be smokers. No Hmong chew tobacco, betel, or miang (fermented tea leaves). Opium was used by 15 percent of Hmong men, which is lower than that of another highland group, but higher than in lowland villages. Another factor may be the sharing of child care responsibilities within large Hmong extended family households. Generally, use of narcotics, alcohol, and tobacco by the Hmong is confined to the older men. Demographic and health conditions among the Hmong were compared with those of other ethnic groups. Thailand Hmong have very large extended family households, very high birth rates, low use of contraception, very young age at first marriage, and compared with other highland minorities, relatively low infant and crude mortality rates. (Auth. Abs. Mod.)

86–1494. Lawrance, L.K. **Self-Efficacy as a Predictor of Smoking Behavior in Young Adolescents.** Doctoral Dissertation, University of Illinois, Urbana-Champaign, University Microfilms International 85-21813, 1985, 137 pp.

Peer influence was the primary determinant of smoking onset among 800 seventh and eighth grade students in a midwest working-class city. The opportunities to smoke and emotional influences were also important factors. The preventive health behavior study investigated the predictive and diagnostic utility of a self-efficacy scale for adolescents (using cigarette smoking as an unhealthy behavior) to predict smoking behavior and to diagnose the most vulnerable factors associated with smoking onset. Data collected over an 8-month period on 50 self-efficacy items, which included social and emotional variables and a self-report of smoking behavior, revealed an association between the total self-efficacy score and reported smoking, implying the predictive capacity of the instrument. Social opportunity to smoke, emotional stress, and peer influence were the most predictive variables of smoking behavior. Subscales of these factors distinguished relationships concurrently and longitudinally. Onset smoking behavior was also predictable over 3- and 5-month intervals. No discernible differences emerged between boys and girls. Potential applications of the self-efficacy scale for predicting smoking behavior, designing prevention programs, and evaluating interventions are suggested.

86–1495. Lee, J.F. **Smoking Among Alaska Native Youth. A Profile of the Smoking Patterns in Five Northwest Arctic Communities From Surveys Done for the Purpose of Developing and Evaluating a Smoking and Prevention Program for Alaska Youth.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 737-741.

Smoking characteristics and influencing factors in northwest Alaska and in the United States are similar; however, prevalence rates are much higher in Alaska: 56.4 vs. 33.2 percent of adults, 49.3 vs. 12.7 percent of 12- to 18-year-old girls, and 28.8 vs. 10.7 of 18-year-old boys. The Alaska survey of 377 children, 319 adolescents, and 435 adults was undertaken to determine the extent and pattern of smoking habits in a representative region, as a basis for designing and evaluating the effectiveness of a planned smoking prevention program aimed at youth. Data showed that (1) among adults, 56 percent were smokers, 46 percent smoked daily, and 24 percent smoked a pack/day or more; (2) 8.3 percent of adults chewed tobacco; (3) prevalence among adults was highest among natives aged 40 to 49 years and lowest among persons aged 60 and over; (4) 8.4 percent of 216 children in kindergarten through 3rd grade had smoked, 3.3 percent many times; (5) 9.6 percent of 161 children in 4th through 6th grade had smoked and 8.8 percent smoked often and 20.6 percent chewed tobacco; and (6) smoking among 319 students in 7th through 12th grade varied by community, from a high of 79 percent in Ambler to a low of 21 percent in Noatak. Among the 124 smokers (41.4 percent) in this age group, girls (59 percent) outnumbered boys (41 percent). Over 95 percent of this age group knew that smoking can cause heart attacks and lung cancer, but only 60 to 70 percent were aware of other health consequences. The most significant factor influencing youth to smoke is pressure, from family, friends, or the environment. Among parents surveyed, 91 percent disapproved of children smoking, and there was moderate pressure not to smoke from parents; however, 85 percent of adolescents lived in a household with another smoker.

86–1496. Lepre, S.W. **The Social Meaning of Smoking Among Adolescent Girls.** Doctoral Dissertation, Columbia University, New York, University Microfilms International 85-11523, 1985, 280 pp.

A comparative study in two high schools representing different social class populations revealed that smoking among adolescent girls is related to social class as an individual variable (i.e., socioeconomic status of the father) and as a contextual variable (i.e., "standard" of education in the town's high school). The two schools (within the same county in New Jersey) were Cresswood High School, a prototypical suburban school in an upper-middle and upper class community, and Parkside High School, in a predominately lower-middle class and blue-collar community. The typical Cresswood girl was almost as likely to have tried smoking as the typical Parkside girl; 45.8 percent of Cresswood girls and almost half of Parkside girls had smoked at least five packs of cigarettes in their lifetime. Significant findings included: (1) a higher proportion of lower class girls in both schools smoked, (2) the number of cigarettes smoked/day was greater in the working-class school than in the middle-class school, and (3) both the amount smoked and the number of girl friends who were smokers were attributable to the effect of social class as a contextual variable and were stronger in the working-class high school. Based on findings, recommendations for changes in smoking cessation and prevention programs are offered.

86–1497. Lewis, I.C.; Rayner, K.J.; Schwarzenholz, K.M., et al. **A Decade of Smoking Among High School Students in Hobart, Tasmania.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 743-749.

Among high school students in Hobart, the capital city of Tasmania, smoking declined among boys and increased among girls between 1971 and 1982. Survey data from 1971, 1977, and 1982 indicate that 30 percent had remained heavy smokers (>10 cigarettes/day). Smoking among boys aged 13 to 16 years decreased from 33.5 percent in 1971 and 29.8 percent in 1977 to 23.6 percent in 1982. Among girls, smoking decreased from 32.2 percent in 1977 to 27.4 percent in 1982. At 16 years of age, the proportion of heavy smokers (>10 cigarettes/day) was higher among boys (30 percent) than among girls (11.5 percent); 51.2 percent of girls and 33 percent of boys smoked ≤10 cigarettes/day. Student attitudes toward smoking indicate that health education needs to be reviewed: over 40 percent of smokers believed that smoking <20 cigarettes/day is not harmful, and only 29 percent agreed that any amount of smoking is injurious. Even among nonsmokers, nearly 20 percent thought that smoking <20 cigarettes/day was harmless. It is noted that as the students got older, more felt that any amount of smoking was potentially harmful, probably reflecting the effect of health education, which was concentrated in the 15-year-old groups. Students of both sexes from the lowest socioeconomic school areas were more likely to be smokers than those from better-off environments. It was concluded that no school had a comprehensive antismoking education program covering all grades and all students.

86–1498. Lim, V.J. **Motivational Factors Distinguishing Successful and Unsuccessful Abstainers in Smoking Cessation Programs.** Doctoral Dissertation, University of California, Los Angeles, University Microfilms International 85-19123, 1985, 128 pp.

Data showed that the motivations of smokers entering a smoking cessation program do not distinguish between successful and unsuccessful abstainers. The Motivational Analysis Test (MAT) was given to 159 smokers to determine if motivational factors assessed at entrance to a smoking cessation program could distinguish quitters who would be successful in abstaining for 3 months. When MAT scores are combined with other significant data in discriminant analysis, the MAT does identify three groups: abstainers, recidivists, and maintainers. Change in motivation scores on a second MAT administered 7 to 10 days after program entrance did identify recidivists. Additionally, an instrument assessing perceived commitment to quitting identified maintainers. A profile created from MAT scores describes the typical smoker entering the cessation program as having low interest in career, home, ethical values, hostility, and self-assertion; average interest in security, self-sentiment, and sex; and above average interest in narcism-comfort and the sweetheart-spouse sentiments. The typical smoker also experienced average frustration in all parameters except the sweetheart-spouse sentiment, which was above average. Implications of findings toward developing more effective smoking cessation programs are discussed. (Auth. Abs. Mod.)

86-1499. Lochsen, P.M. **The Impact of the Norwegian Smoking Control Policy on the Smoking Habits of Different Social Groups.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 315-322.

Survey data since 1973, following implementation of smoking control policies in Norway, show that smoking has declined among men in different educational and occupational groups, but smoking among women has remained almost unchanged. Smoking among men, analyzed by age, has shown a consistent decline except in those aged 65 to 74 years, with the greatest decline in the 45 to 54 age group. Even though the proportion of smokers among men with a college-level education is more than 17 percentage points below that of men with only a primary school education, the significant decline found in the less educated must be termed one of the most encouraging findings. Among women, age is a far more important factor than among men, with a significant decline in smoking rates noted only in the youngest age group and in those aged 35 to 44 years. Smoking habits were also strongly associated with occupation and marital status. It is speculated that smoking will be a predominantly female health problem in Norway in about 20 years. Norwegian smoking control policy has not been able to influence women as it has men, partly because much of the education in this field has focused heavily on the health hazards for men. Social differences were important in distinguishing different smoking habits, but smoking penetrated into all social groups. However, very often smoking is a habit that is formed long before the individual can be defined as belonging to a specific social group, and variables describing the social background of an individual as a child and at the time of smoking initiation would probably provide interesting information for analysis.

86-1500. Lopez Rois, F.; Couselo Sanchez, J.M.; Gallego Garcia, M.D., et al. **El Habito del Tabaco Entre la Poblacion Infantil. [Smoking Behavior of Children.]** *Anales Expanoles de Pediatria* 23(4):241-245, October 1985, Spanish.

Among 240 schoolchildren between 8 and 14 years of age in urban and semiurban Galicia (Chile), 29 percent smoked and 19.6 percent were habitual smokers. More boys than girls aged 12 to 14 years who were low academic achievers from working class backgrounds were smokers (35.6 percent vs. 23 percent, respectively). Smoking outside the home was associated with alcohol consumption (65 percent of smokers were habitual drinkers). It was also found that cigarette consumption was higher among children who had parents who were smokers. Only 1.25 percent of the children reported habitual marijuana consumption. (Auth. Abs. Mod.)

86-1501. Miller, P.M.; Surtees, P.G.; Kreitman, N.B., et al. **Maladaptive Coping Reactions to Stress. A Study of Illness Inception.** *Journal of Nervous and Mental Disease* 173(12):707-716, December 1985.

A mental illness study of 576 Edinburgh women found that there may be a personality type that is vulnerable to depression and that is being tapped (somewhat imperfectly and incompletely) by anger in, anger out, rumination, smoking, and drinking. When formed into a scale, these reactions distinguish people who are psychiatrically ill from those who are well. Eleven ways in which people might react to life stress were studied (including smoking, alcohol consumption, anger at oneself (anger in) or anger at someone else (anger out), and rumination). The women were asked whether reaction in any of the 11 ways in the past 6 months had been in response to specific life stresses. Anger in, anger out, rumination, use of alcohol, and use of tobacco all discriminated between those who were well and those who were psychiatrically ill at first interview. Followup analysis of 306 women who were well at first interview showed that 35 suffered a psychiatric illness episode (23 depression, 12 anxiety) within the subsequent year. Maladaptive reaction at first interview predicted later illness inception, even after taking life stress into account. Several extraneous variables were considered, none of which could explain this effect. Maladaptive reaction seemed sometimes to lead to illness even when there was only minimal later life stress. Attempts to find coping reactions that provide protection against illness inception were unsuccessful. (Auth. Abs. Mod.)

86-1502. Mintz, J.; Boyd, G.; Rose, J.E., et al. **Alcohol Increases Cigarette Smoking: A Laboratory Demonstration.** *Addictive Behaviors* 10(3):203-207, 1985.

Alcohol consumption increased cigarette smoking, supporting the theory that a direct causal mechanism exists that makes smoking more desirable after drinking. Fourteen men, narcotic addicts in methadone maintenance treatment, attended two sessions in which they drank either an alcoholic drink or orange juice and smoked three cigarettes at 20-minute intervals. Drinking alcohol significantly increased the amount and rate of smoking and affected the style of smoking, although the number of cigarettes smoked remained the same: (1) 10 men smoked more after drinking alcohol; (2) the average smoker smoked 21 percent more on the day that alcohol was consumed ($p<0.02$); (3) individual puff volumes for the first cigarette averaged 4.8 cc larger after drinking alcohol ($p<0.02$); (4) the rate of smoking over all three cigarettes averaged 0.25 cc/minute faster after drinking alcohol ($p<0.03$); and (5) most smokers took larger and more rapid puffs after the alcoholic drink, resulting in an increase in the total volume of smoke inhaled. There was no significant difference in the total number of puffs taken, however, and the greatest effect on individual puffs occurred on the first cigarette. Smokers who smoked lightly on the orange juice day were more likely to show substantial increases in smoking after drinking alcohol, while smoking by those who smoked heavily did not tend to increase. (Auth. Abs. Mod.)

86–1503. Molimard, R. **Developper la Recherche en Matiere de Dependance. [Developing Research on the Matter of Dependence.]** In: Molimard, R. (Editor). *3ème Journee de la Dependance Tabagique.* Comptes Rendus, U.E.R. Biomedicale des Saints-Peres, Paris, June 1985, 6-19, French.

The battle against tobacco cannot be won until tobacco dependence is fully understood. Each year in France, some 71,000 individuals (out of 550,000) die from tobacco-related diseases. Despite worldwide research into various aspects of tobacco and its impact on societies (the Smoking and Health Bulletin for 1983 listed 2,075 research studies), only 17 studies between 1979 to 1983 investigated the phenomenon of tobacco dependency. Tobacco dependency needs to be investigated more thoroughly because (1) tobacco acts like a drug, and (2) smokers are not rejecting tobacco. It is suggested that more worldwide meetings/conferences be held, and that more grants be allocated to young researchers to examine tobacco dependency. It is proposed that special education on dependence be created at the university level, and that permanent research into dependency be established and provided with adequate funding for continuing research.

86–1504. Murray, M. **The Social Context of Smoking During Adolescence.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 757-762.

Peripheral data from a large-scale survey of smoking (Derbyshire, England) are used to describe the meaning of smoking to adolescents, by placing smoking within its social context. During the period of transition between childhood and adulthood, adolescents experiment with a range of new identities. Not only smoking, but also the style of smoking and the preferred brand of cigarettes are used to accentuate a particular image: boys might smoke high-tar cigarettes to accentuate manliness; girls might prefer low-tar mentholated brands to emphasize femininity. Intervention strategies, therefore, should (1) reduce the positive social connotations of smoking, and (2) alter the social environment so that the value of smoking is reduced. National action to reduce public acceptability of cigarette smoking could involve restrictions on promotional campaigns, availability of cigarettes, and smoking in public places. The contradictory nature of smoking, i.e., assertion of independence becomes dependence on cigarettes, should be emphasized. Social changes that would allow adolescents to achieve independence without resorting to smoking need to be explored.

86–1505. Nater, B.; Junod, B.; Gutzwiller, F., et al. **Influence du Milieu Familial sur l'Evolution de la Consommation de Tabac Dans 2 Villes d'Intervention et 2 Villes Temoins Suisses. [Family Influence on Changes in Tobacco Consumption in Two Intervention and Two Control Cities in Switzerland.]** *Revue Epidemiologie et Sante Publique* 33:90-96, 1985, French.

A cardiovascular risk factor modification study in four Swiss cities (National Research Program 1A, "Primary Prevention of Cardiovascular Disease in Switzerland"), between 1977 and 1981, investigated the influence of family members on changes in tobacco consumption. Two intervention cities with community health education programs and two reference cities were included. The net decline in regular smokers (3.6 percent) was significant in the intervention cities ($p<0.05$); however, family members showed no significantly different patterns. In contrast, a significant influence existed among adult family members for both the decrease ($p=0.0001$) and the increase ($p<0.005$) in tobacco consumption. (Auth. Abs. Mod.)

86–1506. O'Byrne, D.J. **A Study of Adolescent Smoking in the Greater Dublin Area.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 763-771.

Three times more 12-year-old Irish girls smoked in 1980-1981 than in 1970 when a similar survey of adolescent smoking habits in the Greater Dublin area was conducted. In 1970, 35 percent of boys and 18 percent of girls were regular smokers, but in 1980, the number had declined to 34 percent among boys and increased to 26 percent among girls. In 1970, only 18 percent of girls smoked more than 40 cigarettes/week; in 1980-1981 the number had risen to 38 percent. It is estimated that by the age of 17, 30 percent of girls are regular smokers; however, consumption was higher among boys than among girls in all age groups. A high percentage of boys begin smoking at an early age. The number of smokers aged 15 to 17 years declined slightly between 1970 and 1980-1981. Fewer parents approved of children smoking in the later survey, but it also appears that parental influence is declining. Peer pressure remained important; 6 out of 10 smokers obtained their first cigarette from a friend. Among regular smokers, 62 percent of the boys and 55 percent of the girls wanted to stop smoking. Among member states of the Common Market, Ireland has the highest per capita consumption of cigarettes.

86–1507. Onadeko, B.O.; Awotedu, A.A.; Onadeko, M.O. **Smoking Patterns of Students in Higher Institutions of Learning in Nigeria.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 773-780.

Data show that smoking is increasing among students in postsecondary institutions in Nigeria, although most are still light smokers (<10 cigarettes/day). Survey responses from 1,480 students showed 436 men (29.5 percent) and 174 women (20.7 percent) were smokers ($p<0.001$). Among university students, 24.7 percent of men and 23.5 percent of women were smokers; in polytechnical schools the proportions were 21.2 percent and 30 percent, respectively. Most smokers were 21 to 30 years of age and most had smoked for 1 to 10 years (33 percent of men and 9 percent of women reported starting in high school). Approximately 75 percent of smokers were aware of adverse health effects, and a significant number had experienced cough, shortness of breath, chest pain, and abdominal discomfort. In contrast to findings in Europe and America, the influence of friends and environment are more important than parental example as reasons for smoking. This difference is understandable, because many students are first generation literates not influenced by their parents. It also supports the assumption that smoking increases with education, income, and adoption of western culture. Most students did agree that children should be discouraged from smoking through health education, mass media, parents (by example), and legislation.

86–1508. Pikiewicx, K.; Kuc, K.; Morgenstern, W. **Czestosc Wystepowania Nalogu Palenia Papierosow w Populacji Mezczyzn 8 Zakladow Prezemyslowych Wroclawia. [The Frequency of Smoking Habit in Population of Men in Industrial Plants in Wroclaw.]** *Przeglad Lekarski* 6:528-531, 1985, Polish.

Men who smoked more than 20 cigarettes/day represented 42.9 percent of the 7,407 men studied, who were involved in the Wroclaw program of primary prevention of coronary disease. The number of cigarettes smoked/day and the duration of smoking were established. Of the 4,640 smokers in the total group (62.6 percent), 3,180 (68.5 percent of all smokers) smoked more than 20 cigarettes/day and only 86 men (1.9 percent) smoked less than 5 cigarettes/day. The mean number of cigarettes smoked was 19.8 and the mean duration of smoking was 22.5 years. Heavy smokers exhibited smaller body weight, lower concentration of glucose in serum, lower systolic and diastolic blood pressure, and higher serum concentrations of cholesterol and triglycerides. (Auth. Abs. Mod.)

86–1509. Revell, A.D.; Warburton, D.M.; Wesnes, K. **Smoking as a Coping Strategy.** *Addictive Behaviors* 10(3):209-224, 1985.

Data on smoking as a coping strategy and its relationship to other coping strategies and personality suggests that individuals who tend to self-medicate also tend to choose their brand of cigarette on the basis of the pharmacological effect. Survey responses from 357 nonsmokers and 93 smokers indicated that the undergraduates could be separated into three distinct groups: those who sought help from their friends when faced with problems, those who sought "expert advice," and those who attempted to solve their problems alone (often with the use of drugs). A strong positive correlation emerged between likelihood of problem self-solving with drugs and number of cigarettes smoked/day ($p<0.001$), number of years smoking ($p<0.01$), importance of cigarette strength ($p<0.01$), and frequency of controlled drug use. The number of cigarettes smoked/day correlated positively with number of years smoking ($p<0.001$); positively with number of attempts made to give up smoking ($p<0.01$); and negatively with age of smoking initiation ($p<0.05$). The likelihood of smoking in high arousal and in low arousal situations correlated positively with each other, with the number of cigarettes smoked at all different times of day ($p<0.001$), and with extraversion. Women were more likely to talk over their problems with a friend, their parents, or a doctor, while men were more likely to resolve their own problems or to solve them by using drugs. Smokers are more likely to use drugs to solve problems than nonsmokers, a difference that is statistically significant for men, women, and both sexes combined ($p<0.001$). It is suggested that, for smokers who meet life's challenges with the support of self-medication substance use, giving up smoking may have adverse consequences. Among women, smokers scored higher on the extraversion scale than nonsmokers; among men, smokers scored higher on the neuroticism scale than nonsmokers. Smokers also drink more alcohol, tea, and coffee than nonsmokers.

86–1510. Rootman, I.; Smart, R.G. **A Comparison of Alcohol, Tobacco and Drug Use as Determined From Household and School Surveys.** *Drug and Alcohol Dependence* 16(2):89-94, November 1985.

Fifteen-year-old respondents were more likely to report daily tobacco use in surveys conducted at school than in the home (32 vs. 10 percent), while reporting by 18-year-old smokers was more likely to occur in the home. Among all students under 18 years of age, the proportions reporting tobacco and cannabis use were lower in household surveys than in school surveys. The questions asked were similar but not identical. At school students were asked, "In the last 12 months how often did you use tobacco?" In household surveys the question was "Do you smoke cigarettes daily?" In 1983, 4,737 students enrolled in grades 7, 9, 11, and 13 in Ontario public and private schools responded to a survey (about 86.4 percent participation). The household survey sampled 2,400 young people aged 12 to 19 years. In general, results indicate that respondents were more likely to give socially desirable answers to questions answered at home than at school. Surveys also inquired into alcohol and drug use.

86–1511. Shanmuganandan, S.; Thirumalaikolundusubramanian, P. **Smoking and Rural Health Behavior.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 281-285.

A questionnaire survey of a random sample of the population of 11 villages in India, which varied in socioeconomic status and in proximity to urban centers, showed that smoking was primarily a habit of men, begun before the age of 20 years. Although bidis were widely used in almost all the villages, cigarettes were also being used in some villages, perhaps due to proximity to urban areas, the impact of urbanization, a higher literacy level, and a higher social status. It was also found that (1) the proportion of nonliterates among smokers was as high as 70 to 80 percent in some villages; (2) only 14.8 percent of smokers were from the high income group; (3) between one-tenth and one-eighth of daily earnings was spent on smoking; (4) daily consumption was influenced by economic status, literacy level, nature of work, and proximity to urban areas; (5) 2.2 percent of smokers never inhaled and 5.2 percent always inhaled; and (6) 60 percent of smokers consumed three-quarters of each cigarette or bidi, mainly because of the money spent. There was a significant association between income groups and materials used for smoking among literates ($p<0.005$), but no association was found among nonliterates. Nearly 50 percent were aware of the smoking-related risks of respiratory disease. Suggestions for a behavior-oriented approach to smoking control, including health education, legislation to ban advertising and to regulate smoking in public places, and antismoking counseling, are provided.

86–1512. Shiramizu, M.; Shibata, A. **Chukakusei no Kitsuen to Shoinshi Tono Kanren Dainiho Kitsen Kodo to Kitsuen ni Yoru Kenkoshogai ni Kansuru. Chishiki Narabi ni Seikatsu Kankyo to no Kanren. [A Study on Factors Concerned with Smoking Behaviors Among Pupils of Junior High School. Part 2. Knowledge of Disease Caused by Smoking and Living Environment Associated With Smoking Behavior.]** *Nippon Eiseigaku Zasshi* 40(3):651-658, 1985, Japanese.

Knowledge of disease caused by smoking and the living environment associated with smoking behavior was examined among 4,303 boys (298 smokers) and 4,172 girls (99 smokers) from 11 junior high schools. Data analysis revealed that friends' smoking behavior was the best predictor of smoking, followed by the amount of spending money available each month. The odds ratio was increased with the number of friends who smoked and the amount of money available. A similar relationship was also observed between sibling smoking habits and one of the pupils, maternal smoking habits and one of the pupils, and between pupil smoking habits and the enjoyment of school life. The majority of nonsmokers (90 percent) and smokers (80 percent) knew that smoking causes lung cancer, but only about a third of all the pupils were aware that smoking causes heart disease and chronic bronchitis. Most pupils who knew that smoking is harmful to health were nonsmokers. (Auth. Abs. Mod.)

86–1513. Soper, F.A. **Smoking and Religion.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 383-384.

The Five-Day Plan to Stop Smoking, an early smoking cessation plan developed by the Seventh-Day Adventists, has helped many people quit all over the world. The plan is offered in the church's health care centers and hospitals, and as a community service, frequently sponsored in cooperation with voluntary agencies, such as cancer societies, lung or heart associations, or with medical societies, government agencies, or educational institutions. "One in Twenty Thousand," a widely distributed antismoking film produced by the Seventh-Day Adventists has been viewed by a hundred million people. It was featured in England at the time the report on Smoking and Health was released by the Royal College of Physicians in 1962 and in the United States when the first Surgeon General's report came out 2 years later. In addition to this effort to help people quit smoking, the Seventh-Day Adventists have a strong education program for prevention that utilizes visual aids, films, publications, and seminars.

86–1514. Stanwick, R.S.; Sawatzky, V.; Legge, D.A. **Smoking Trends in Thunder Bay, Ontario High School Students.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 781-784.

Unusually high prevalence of smoking was reported for adolescent girls aged 14 to 19 years in a Canadian (Thunder Bay, Ontario) high school survey of 947 students. Smoking prevalence among girls was 31 percent of 14-year-olds, 34 percent of 15-year-olds, 47 percent of 16-year-olds, 47 percent of 17-year-olds, 45 percent of 18-year-olds, and 44 percent of 19-year-olds. Comparable percentages for boys were 19, 27, 35, 30, 28, and 20 percent. Over 40 percent of all smokers consumed >2 packs/week. Although boys initiated smoking earlier, by 11 years of age the proportions of boys and girls who experimented with cigarettes was the same. Significantly more boys than girls had never tried smoking (37.8 percent vs. 25.1, $p<.001$). Parental smoking had a significant effect on student smoking patterns: when the mother smoked, 51.7 percent of daughters and 21.2 percent of sons smoked; when both parents smoked, 48.5 percent of daughters and 32 percent of sons smoked. For both sexes, parental smoking was significantly correlated with smoking at age 14 and 15 years ($p<.001$); however, after the age of 15, the effect rapidly diminished.

86–1515. Thambypillai, V. **Smoking Among Urban Malaysian School Children.** *Social Science and Medicine* 21(7):819-823, 1985.

Survey data for 4,106 students (mean age 16.1 years) in eight coed, four all boys, and four all girls secondary schools in Kuala Lumpur (Malaysia) revealed that 32.8 percent had tried smoking (mean starting age 13.3 years) and 17.3 percent of the 2,099 boys and 1.6 percent of the 2,007 girls were smokers. Average duration of smoking was 2.5 years. Most smokers and occasional smokers were boys: of 364 who smoked, 27.5 percent were regular smokers. About 42 percent of smokers wanted to quit and only 1 percent of nonsmokers expressed a desire to smoke in the future. Mean age of initiation was 13.6 years for boys who smoked; 13.2 years for boys who became nonsmokers; 13.9 years for girls who smoked; and 12.8 for girls who became nonsmokers. The interval between initiation and establishment of smoking was 0.2 years. It is suggested that antismoking health education programs be initiated before students begin experimenting with smoking and be continued through secondary school, where the number of smokers increases with each school year. (Auth. Abs. Mod.)

86–1516. Thomaschewski, P. **Smoking Among Children.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 387-388

Smoking by adolescents in West Germany is not only tolerated, but actually approved. According to statistics, adolescents between the ages of 12 and 17 years smoke up to 10 cigarettes/day. Most high schools have "smoking rooms" where adolescents can smoke during free periods or spare time. It is recommended that smoking be banned in schools and that television, public relations, and health education convey the hazards of smoking to young people. It is only by changing attitudes and through continued education that the problems associated with smoking can be overcome.

86–1517. Thomson, M.P. **The Smoking Habits of Native Canadians.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnepeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 785-787.

Smoking habits among Canadian Indians, Inuit, and Metis, who together comprise about 5 percent of the Canadian population, are reviewed. The Nutrition Canada survey in 1970 to 1972 indicated that 59.5 percent of Indian men and 56.4 percent of Indian women smoked compared with 43 percent of non-Indian men and 34.0 percent of non-Indian women. A community survey in 1973 to 1974 of 1,055 Indian residents of remote and isolated settlements in northern Ontario found that 48 percent of those aged ≥ 15 years were smokers compared with 38 percent in the general population. The highest prevalence, 59.2 percent, was among 15- to 19-year-olds. On the basis of 1980 sales of the Hudson's Bay Company in the Central Arctic, 45 percent of cigarettes sold to Inuits had >17 mg tar and 44 percent had 14 to 17 mg tar. The Smoking Habits of Canadians survey reported that 22 percent of Canadians smoked cigarettes with >17 mg tar, and 44 percent of cigarettes smoked were between 14 to 17 mg. The direct effect on the smoker is only part of the problem. Secondhand smoke in overcrowded homes aggravates respiratory disease, and cigarette-caused fires are commonplace. Smoking in pregnancy contributes to infant mortality. It is anticipated that by 1986, the Native young adult population (aged 14 to 29) will increase by 35 percent (from 86,000 to 116,500). With no special smoking education programs for Natives, current health habits will be passed on to the next generation.

86–1518. Tunstall, C.D.; Ginsberg, D.; Hall, S.M. **Quitting Smoking.** *International Journal of the Addictions* 20(6-7):1089-1112, June-July 1985.

Four factors influence smoking treatment outcome: environmental variables, client characteristics, process variables, and specific treatment approaches. Important environmental factors are stress and social support. Data on client characteristics show that (1) sex is the best predictor of treatment success; (2) men are more likely to quit and maintain abstinence than women; (3) the majority of women alter smoking habits during pregnancy; (4) extraverted persons are more likely to begin smoking and to have difficulty quitting; (5) anxious, poorly adjusted smokers have more trouble quitting than less troubled smokers; and (6) smokers with a high sense of self-efficacy have a better chance of entering treatment and doing well. Smokers who take in lower levels of nicotine are more successful at quitting. Low-income persons and ethnic minorities have a larger percentage of smokers than the population at large, but are underrepresented in treatment studies. Skill and empathy of group leaders is more important than smoking history. Therapists should be aware of nonspecific treatment factors (i.e. positive expectations, social reinforcement, and self-disclosure) and specific treatment approaches. Also, innovative treatments that address social support systems and physiological addiction are promising treatments for individuals requiring a structured or intensive method of quitting. (Auth. Abs. Mod.)

86–1519. Wise, R.E. **The Use of Alcohol, Tobacco, and Coffee: A Study of Relationships.** Doctoral Dissertation, Vanderbilt

University, George Peabody College for Teachers, Nashville, University Microfilms International 85-17437, 1985, 85 pp.

A possible relationship between excessive use of alcohol, cigarettes, and coffee was investigated in 137 diagnosed alcoholics (112 smokers) hospitalized for treatment and 129 patients (39 smokers) in outpatient psychotherapy with no evidence of alcoholism to identify predictors of covert alcohol and test the null hypothesis that there is no significant difference in coffee consumption and levels of cigarette ingestion between alcoholics and nonalcoholics. Analyses revealed that persons diagnosed as abusing or dependent on alcohol generally smoke more cigarettes and drink more coffee than persons in therapy for other conditions: 34.92 cigarettes/day vs. 22.15 cigarettes/day, respectively. Inpatient smokers who did not drink coffee consumed 34.93 cigarettes/day; those who drank coffee smoked 35.65 cigarettes/day. Results indicate that excessive use of coffee and/or cigarettes has predictive power relative to alcohol abuse or dependence. It also appears that combined use of cigarettes and coffee is synergistic in terms of increasing the demand for both substances. Additional research is needed to investigate the rules of race, sex, and religious preference in the phenomena of alcohol, coffee, and cigarette abuse.

See also **86–1565**

SMOKING PREVENTION AND INTERVENTION

86–1520. Crofton, J.; Wood, M. (Editors). **Smoking Control. Strategies and Evaluation in Community and Mass Media Programmes.** London, Health Education Council; Belfast, Ulster Cancer Foundation; and Edinburgh, Scottish Health Education Group, 1985, 120 pp.

National smoking control campaigns are useful in accentuating antismoking awareness and changes in knowledge, attitudes, specific responses, and smoking cessation attempts. The antismoking mood can be enhanced through promotions, publicity, public relations, and sponsorship of events. Regional campaigns, through joint action and funding, can stimulate innovation, encourage training through collaboration, and provide a network of local voluntary action groups. District campaigns can promote health education programs, cessation clinics, and local events; establish no smoking areas; and encourage advertising bans in public places. This workshop report places special emphasis on target groups (e.g., smokers who want to quit), decisionmakers and potential allies (trade unions, insurance companies), and health professionals. Types of campaigns, strategies, and means for evaluation are also discussed and problems associated with evaluating the effects of smoking control campaigns, i.e., usefulness and limitations, are analyzed.

86–1521. Dawley, H.H.; Burton, M.C. **Smoking Control in a Hospital Setting.** *Addictive Behaviors* 10(4):351-355, 1985.

Unobtrusive observations of smoking behavior at four hospital areas designated as no smoking and two designated as smoking revealed almost total compliance with a revised and stringent smoking control policy. Over a 5-day period of observation, the percentage of smokers seen in the four no-smoking areas was 0 in the ambulatory care clinic waiting area, 0.16 (n=2) in the no-smoking lobby, 0.77 (n=4) in the first floor main hallway, and 2.84 (n=27) in the second floor main hallway. The prevalence of smoking in the smoking areas was 17.21 percent (n=179) in the large dining area and 17.14 percent (n=107) in the smoking lobby. Of particular interest was the observation that implementation of the smoking control policy appeared to add courage to many nonsmoking employees to speak out against smoking when it was in violation of posted regulations. Also of particular importance was the absence of complaints from patients and employees following initiation of the smoking control program. The implications of practical, cost-effective smoking control procedures existing for hospitals are discussed in reference to their liability to protect patients from controllable hazards. (Auth. Abs. Mod.)

86–1522. Ferguson, K.J.; Pomrehn, P.R.; Caplan, R.M. **Help Your Patients Kick the Cigarette Habit.** *Iowa Medicine* 75(11):495-497, November 1985.

A survey of 441 Iowa physicians (aged 29 to 82 years) showed that 65 percent discussed negative effects of smoking with patients, 34 percent provided suggestions for quitting, 8 percent referred patients to cessation programs, 9 percent provided a booklet, and 3 percent scheduled followup sessions. Among the doctors (94 family physicians, 38 internists, 20 obstetrician/gynecologists, 14 pediatricians, and 21 general surgeons), 4 percent were current smokers, 36 percent were ex-smokers, and 60 percent were never smokers. It is recommended that physicians (1) take careful smoking histories, concentrating on patient interest in quitting and in past attempts; (2) recommend cessation of smoking, citing health problems aggravated by smoking; (3) provide self-help materials; (4) set target date for smoking cessation and schedule followup sessions; (5) recommend patients to cessation programs; and (6) prescribe nicotine gum as an adjunct to other interventions.

86–1523. Friedman, H.L. **The Health of Adolescents and Youth: A Global Overview.** *World Health Statistics Quarterly* 38(3):256-266, 1985.

Smoking is a worldwide problem; however, prohibition of cigarette sales to minors, bans on smoking in public places, restrictions on advertising, and removal of cigarette vending machines from areas where children congregate are steps that can be taken toward the goal of health for all by the year 2000. Even more important is the example that can be set by adults in the family, sports and entertainment idols, and the mass media. Smoking prevalence varies widely by cultures, but the most alarming trend is the increase among young women, particularly in developed countries. Antismoking campaigns have had some success, the decline being most pronounced among boys aged 17 to 18 years, although slight drops are apparent among boys aged 12 to 16 years and among girls aged 15 to 16 years. Recently, three factors have emerged that make it essential that young people receive special attention in the field of health promotion: (1) menarch is occurring earlier, increasing related risks (unprotected sexual intercourse, unwanted pregnancies, sexually transmitted diseases, induced abortion, and premature parenthood) that can stunt the social, economic, and educational development of the young; (2) urbanization is changing traditional patterns of development, putting young people under enormous strain; and (3) worldwide populations are increasing at an alarming rate (79 percent increase in the number of young people in developing countries between 1960 and 1980). Adolescents and youth thus constitute a significant resource that can be tapped by societies. Three aspects of health are discussed: problems faced by the young, ways of preventing and coping with problems, and the potential role of the young in promoting health for themselves and their societies. Included in the discussion are drug abuse, alcohol consumption, accidents, suicide and parasuicide, sexual and reproductive health problems, disabilities and handicaps, and malnutrition, obesity, and eating disorders.

86–1524. Hauknes, A.; Lochsen, P.M.; Aaro, L.E. **Planning, Development and Evaluation of a Special Smoking and Health Programme for Pupils Aged 12-13 Years.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 721-724.

After determining that the critical age for smoking initiation is 12 to 13 years, the Norwegian National Council on Smoking and Health developed a package of antismoking programs for schools that consisted of (1) information for students on health consequences of smoking, including other antismoking messages; (2) information for parents, requesting their participation and support; and (3) information for teachers in guiding students toward attitude changes. In the first of two field tests, 22 rural schools were divided into four groups: (1) classes were given only the folder prepared for use in the classroom; (2) students received the classroom package and were asked to write an essay on smoking and health; (3) the classroom package was combined with parental support materials; and (4) students received the total program (folder, essay, parental involvement). Cigarette consumption declined 21 percent in group 4 compared with 6 percent in group 1. After program evaluation, materials were improved. The long-term effect of the revised materials has been tested in a second experiment in an urban-rural area. Smoking rates decreased during the first 6 months, and the percentage of smokers increased at a lower rate than expected over the next 6 months. The effects of improved antismoking education and more negative attitudes toward smoking are also discussed.

86–1525. Karunaratne, W.A. **Influencing Civil Servants in the Control of Tobacco Smoking.** In: Forbes, W.F.; Frecker, R.C., Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 313-314.

While Sri Lanka was under British administration, smoking by civil servants was prohibited, but in 1948 (after independence) the rule was abolished and smoking became prevalent almost everywhere. It is suggested that some civil servants (such as administrators functioning directly under Cabinet ministers) are in positions of authority where they could influence decisions regarding smoking. Such civil servants should be educated about the health hazards of smoking. In addition, (1) physicians can serve as role models by refraining from smoking while attending patients; (2) physicians can intervene to encourage cessation of smoking, which can effectively reduce ill health among patients; (3) teachers can be influential in conveying health information to the younger members of society; and (4) antismoking educational materials can be distributed to employees of state corporations, state-controlled banks, and other institutions. The Ministry of Health recently prohibited smoking at all official meetings, workshops, and conferences. A strong antismoking effort throughout the civil service can lead to a national policy designed to protect the rights of nonsmokers to breathe clean air.

86–1526. Novick, L.F.; Jillson, D.; Coffin, R., et al. **The Vermont Health Risk Survey and the Design of Community Wide Preventive Health Programs.** *Journal of Community Health* 10(2):67-80, Summer 1985.

Among 1,594 Vermont residents surveyed on demographic characteristics, preventive health behaviors, and health knowledge, 33 percent were current smokers. Of these, 39 percent had per capita incomes below the poverty level, 38 percent were not college educated, and 41 percent were blue-collar workers. Although there were more smokers among the men than the women (32 vs. 28 percent), the proportion of women who smoked was higher in the group aged 18 to 24 years (32 vs. 28 percent). Other risk factors included alcohol (12 percent), lack of exercise (70 percent), overweight (39 percent), and nonuse of seatbelts (86 percent). Low income, less education, and blue-collar status were also related to lack of exercise and nonuse of seatbelts. Increased prevalence of certain risks was found in 18- to 24-year-olds, i.e., 32 percent of men reported an alcohol risk, and 94 percent reported nonuse of seatbelts. It is suggested that primary prevention activities need to (1) be communitywide, (2) utilize information on epidemiology of health behaviors, (3) influence diverse community groups, and (4) intervene before risk behaviors are established. (Auth. Abs. Mod.)

86–1527. Paccagnella, B.; Fontana, F. **Developments in Italy Since the Venice Conference on Tobacco and Youth.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 323-326.

The first International Conference on Tobacco and Youth, held in Venice in 1981, recommended health education programs and a ban on all cigarette advertising. Organized by Italian health professionals, the World Health Organization, and other international health agencies, the conference concentrated on the problem of smoking and youth from pathological, behavioral, and educational standpoints. Topics discussed included (1) the prevalence of smoking among young people, particularly girls; (2) the role of mass media and adult behavioral models; and (3) the damaging effect of advertising on youthful lifestyles. Of the various health education experiments presented for use in school environments, behavioral modification was considered the most promising strategy. Although a 1962 law prohibited tobacco advertising, the fines were minimal (maximum was about 130 U.S. dollars). A much stronger law, passed in 1983, allows fines of several thousand million lire (millions of U.S. dollars). The Government may even ban the televising of the Grand Prix World Championships because of the cigarette advertising on the cars. The association of general practitioners (GPs) is trying to adopt strategies aimed at obtaining more direct involvement of (1) GPs in epidemiological research on smoking-related problems; (2) teachers in evaluating students' knowledge and attitudes about smoking; (3) schools in creating a generation of nonsmokers; and (4) the public in antismoking campaigns. The establishment and promotion of clubs for ex-smokers was also recommended.

86–1528. Salonen, J.T.; Hamynen, H.; Heinonen, O.P. **Impact of a Health Education Program and Other Factors on Stopping Smoking After Heart Attack.** *Scandinavian Journal of Social Medicine* 13:103-108, 1985.

A Finnish program to control cardiovascular diseases was effective in persuading young and middle-aged men to stop smoking after a heart attack. Followup at 6 and 12 months, which investigated the impact of a health education program and other factors on 102 heart attack patients under the age of 65, found that 25 had stopped smoking within 6 months and remained nonsmokers at 12 months (77 continued to smoke). Of 37 North Karelian men who were smokers, 15 stopped smoking. In the reference area, 10 of 65 previous smokers quit smoking. The proportion of quitters was significantly greater ($p=0.012$) among program participants than in the reference area after allowing for seven confounding factors in multivariate analysis. Men who had not worked before the heart attack had a 15.4-fold probability of continuing to smoke, while men who had been unemployed at least once in the 5 years preceding the heart attack had an 8.8-fold probability of continuing to smoke. A low increase in maximum serum aspartate aminotransferase concentration was related to a 7.8-fold probability, and men who reported that they were almost or totally recovered after a heart attack had a 7.7-fold probability of continuing to smoke. (Auth. Abs. Mod.)

86–1529. Saporta, D.; Andrade, J. **Adiccion al Tabaco: Su Tratamiento por Medio de un Programa Multidisciplinario. [Addiction to Tobacco: Treatment by Means of a Multidisciplinary Program.]** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 43-46, Spanish.

Various approaches for dealing with tobacco addiction in Uruguay are discussed. The Ministry of Public Health recently achieved governmental regulation of protobacco propaganda and cigarette package warning labels and is also directing an antismoking effort toward the medical community. Private organization efforts are helping to make the public aware of the dangers of smoking and are responsible for antismoking therapy groups. Acupuncture treatment in a group of 50 patients yielded clinical responses in 67 percent: 31 percent quit smoking and 36 percent reduced consumption. Another antismoking program described integrates the theories and benefits of acupuncture, mesotherapy and other homeopathies, muscle relaxation exercises, behavior modification and autocontrol exercises, diet, and support therapy to consolidate nonsmoking behavior. Long-term effects of therapy protocol are further increased with smoking and health education. Although experience with the program is not yet sufficient to be statistically significant, highly satisfactory results have been achieved in the patients treated to date. The multidisciplinary approach to curing tobacco addiction offers an effective solution for motivated smokers who want to quit.

86–1530. Spitzer, A. **Materials and Methods for Education About Smoking and Disease.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 385-386.

The demonstrations used by the American Cancer Society to educate people about smoking include "tools" such as pamphlets, posters, teaching guides, films, slides, overhead transparencies, models, exhibits, and iron-ons. Smoking causes disability, disease, earlier death, lung congestion, irritation of cells, tissue destruction, and restriction of air passages and interferes with the respiratory, circulatory, digestive, nervous, and other body systems. American Cancer Society demonstrations of smoking and disease include (1) the "Smoking Water Bottle," which shows why every smoker has a tar-coated mouth and throat, clogged and congested lungs, and poorer breathing; (2) the "Smoking Lungs," which demonstrates why every smoker has blacker lungs, clogged and congested air passages, and irritated cells; and (3) the "Smoking Plastic Bottle" that demonstrates why 90 percent of smoke stays in the lungs, why lungs are congested, why it takes more effort to breathe, and why smoking causes disability, disease, and earlier death. It is noted that education is more effective when presentations employ all the senses and when the person can utilize what is presented. Demonstrations are designed to motivate through vividness, repetition, recency, understanding, recall, and reinforcement. A listing of materials available from the American Cancer Society is provided.

86–1531. Thurmer, H.L. **The Oslo School Study on Smoking and Health Education. A Random Sample of 7-9th Grade Teachers.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 365-369.

Data from a 1981 Norwegian survey of teachers' smoking habits, antismoking attitudes, and health education participation showed that compared with smokers, nonsmokers were (1) more interested in teaching smoking and health education; (2) more convinced that education would have an impact on student smoking; (3) more in favor of restrictions on teachers' smoking on school premises; (4) more interested in participation in a schoolwide antismoking campaign; and (5) more in favor of strict enforcement of the student smoking ban. Nonsmokers, ex-smokers, and occasional smokers felt more involved in, concerned about, or interested in smoking and health education than smokers. Daily smokers tended to disagree with suggestions that smoking and health education was their responsibility and were more in favor of letting external lecturers, the school nurse, or other teachers do it. Data showed 23 percent of the teachers were smokers compared with 43 percent of men and 34 percent of women in the general population, suggesting that teachers are aware of the hazards of smoking and are taking positive action. However, teachers had conflicting ideas regarding how to carry out smoking and health education, and it is therefore recommended that (1) good learning aids be provided for both teacher and student; (2) teachers' college training provide more information on smoking and health education methods for teachers; and (3) efforts to decrease teacher smoking be encouraged.

See also **86–1591, 86–1629, 86–1637**

SMOKING CESSATION METHODS

86–1532. Fagerstrom, K.-O.; Melin, B. **Nicotine Chewing Gum in Smoking Cessation: Efficiency, Nicotine Dependence, Therapy Duration, and Clinical Recommendations.** In: Grabowski, J.; Hall, S.M. (Editors). *Pharmacological Adjuncts in Smoking Cessation.* U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse Monograph 53, DHHS Publication No. (ADM)85-1333, 1985, pp. 102-109.

Topics discussed, relating to use of nicotine gum for smoking cessation, include (1) a review of placebo-controlled trials of nicotine gum, covering smoking cessation studies that satisfy the criteria of placebo control, blindness, randomization of subjects, and long-term followup; (2) how nicotine dependence interacts with nicotine gum therapy, based on the theory that the more nicotine-dependent a smoker is the better the effect of the gum should be relative to placebo or a non-gum condition; (3) analysis of duration of nicotine gum therapy attempts to define the optimum use duration that would provide the best long-term abstinence rates; and (4) the importance of long-term followup. It is concluded that (1) nicotine gum should be used only when smoking is completely terminated and not in conjunction with successive reduction of smoking; (2) gum should be prescribed in sufficient quantity and for a sufficiently long time period as judged by the patient; (3) nicotine dependence should be assessed prior to prescribing gum; (4) a sample of nicotine gum should be available at consultation to facilitate acceptance; and (5) followup consultation should be utilized after nicotine gum use is terminated.

86–1533. Grabowski, J.; Hall, S.M. **Tobacco Use, Treatment Strategies, and Pharmacological Adjuncts: An Overview.** In: Grabowski, J.; Hall, S.M. (Editors). *Pharmacological Adjuncts in Smoking Cessation.* U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse Monograph 53, DHHS Publication No. (ADM)85-1333, 1985, pp. 1-13.

The five categories of approaches to smoking cessation reviewed include public intervention or information campaigns, "self-help" programs, group support programs, individualized behavioral intervention programs, and pharmacological interventions. It has become evident that optimal cessation programs may include combinations of behavioral intervention, group support, and use of pharmacological adjuncts. It appears that nicotine gum combined with behavioral programs that emphasize relapse prevention produce the best outcome. These group-based procedures, which rely heavily on social reinforcement, including a variety of specific positive reinforcement and punishment techniques, and which include followup support, will likely prove to be the most beneficial strategy for most smokers. Questions regarding the usefulness of nicotine gum are addressed. Results with nicotine gum have been favorable; however, as with other pharmacological adjuncts for drug abuse or tobacco use, the gum is not a panacea. It is important that the gum be used in conjunction with an appropriate array of behavioral intervention techniques and environmental influences.

86–1534. Grabowski, J.; Hall, S.M. (Editors). **Pharmacological Adjuncts in Smoking Cessation.** U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse Research Monograph 53. DHHS Publication No. (ADM) 85-1333, 1985, 149 pp.

The relationship between tobacco use and detrimental effects on health is clear, but it is less clear how those who are dependent on tobacco can be helped. Recently, several agents have been introduced or recommended for use in smoking cessation on the basis of controlled trials. This monograph, which reviews and samples the most recent literature and scientific work on nicotine and tobacco dependence, includes reports on (1) Tobacco Use, Treatment Strategies, and Pharmacological Adjuncts: An Overview; (2) Rational Basis for Chemotherapy of Tobacco Dependence; (3) The Titration Hypothesis Revisited: Nicotine Gum Reduces Smoking Intensity; (4) Cardiovascular Effects of Nicotine Gum and Cigarettes Assessed by ECG and Echocardiography; (5) Characterization of Tobacco Withdrawal: Physiological and Subjective Effects; (6) Short-Term Effects of Nicotine Gum; (7) Nicotine Gum vs. Placebo Gum: Comparisons of Withdrawal Symptoms and Success Rates; (8) Nicotine Chewing Gum in Smoking Cessation: Efficiency, Nicotine Dependence, Therapy Duration and Clinical Recommendations; (9) Theoretical Background and Clinical Use of Nicotine Chewing Gum; and (10) Psychological and Pharmacological Approaches to Smoking Relapse Prevention.

86–1535. Hajek, P.; Belcher, M.; Stapleton, J. **Enhancing the Impact of Groups: An Evaluation of Two Group Formats for Smokers.** *British Journal of Clinical Psychology* 24(Part 4):289-294, November 1985.

The success rate of a smokers' clinic program increased from 47 to 67 percent when the traditional therapist-led educational structure was replaced by a group format that relied more on the resources of the group. In otherwise identical 12-month smoking cessation programs, 132 smokers were treated in 14 therapist-oriented groups run in traditional didactic style, and 138 smokers were treated in 14 groups that emphasized group support, group pressure, and spontaneous modeling of coping strategies. There was a significant group effect on success rates ($p<0.005$). Initial group size was a significant covariate for outcome, with larger groups being more successful ($p<0.05$). The therapist's increasing experience and the presence of cotherapists had no significant effect on outcome. Although there was no difference between groups in the proportion of people who succeeded in stopping smoking early in the course, significantly more people from the group format succeeded later after initially failing. At 1 year followup (8 nonresponders were counted as failures), 28 percent in the group format compared with 17 percent in the therapist format claimed abstinence ($p<0.05$). It is suggested that more group autonomy may make sessions more attractive and more effective.

86–1536. Hall, S.M.; Killen, J.D. **Psychological and Pharmacological Approaches to Smoking Relapse Prevention.** In: Grabowski, J.; Hall, S.M. (Editors). *Pharmacological Adjuncts in Smoking Cessation.* U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse Monograph 53, DHHS Publication No. (ADM)85-1333, 1985, pp. 131-143.

Data from two trials that examined the effects of smoking cessation treatments combining psychological and pharmacologic methods suggest that use of nicotine gum should be combined with considerable psychological support. Nicotine chewing gum was used as a pharmacologic aid to help achieve and maintain abstinence; aversive smoking procedures were used to produce rapid cessation; and cognitive behavioral skills training was included to help participants develop strategies for identifying and coping with high risk episodes. In both trials, intensive behavioral treatment combined with nicotine chewing gum produced some of the highest long-term abstinence rates ever reported, especially in relatively early assessments. In one trial, cessation rates at 10.5-month followup were 23, 30, and 50 percent, respectively, for groups receiving nicotine gum, skills training, and combined treatment. In the other trial, abstinence rates at 12-month assessment were 37 percent for those receiving nicotine gum in a low contact group, 28 percent among the intensive behavioral treatment group, and 44 percent for the combined treatment group. Research designed to develop and evaluate physician-administered treatments combining nicotine gum and psychological interventions is warranted.

86–1537. Hatsukami, D.; Hughes, J.R.; Pickens, R. **Characterization of Tobacco Withdrawal: Physiological and Subjective Effects.** In: Grabowski, J.; Hall, S.M. (Editors). *Pharmacological Adjuncts in Smoking Cessation.* U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse Monograph 53, DHHS Publication No. (ADM)85-1333, 1985, pp. 56-67.

Studies to determine characteristics of tobacco withdrawal and whether nicotine replacement therapy can reduce the number and intensity of withdrawal symptoms found that changes that reliably and consistently occur in chronic smokers after tobacco deprivation include decreased heart rate, increased caloric intake/eating, increased number of awakenings during sleep, increased craving for tobacco, and increased confusion as measured by the Profile of Mood States (POMS). Other changes that occurred in some but not all studies included decreased orthostatic heart rate, increased irritability, and decreased vigor score on the POMS. More research is needed to determine whether changes are true pharmacological withdrawal symptoms or the result of removal of the pharmacological effects and subsequent return to baseline, interruption of a positively reinforced behavior, or occurrence of a disruptive event. Determination of symptoms that result from behavioral or physical dependence can lead to more directed treatment approaches.

86–1538. Hughes, J.R. **Nicotine Gum to Treat Panic Attacks? (Letter).** *American Journal of Psychiatry* 143(2):271, February 1986.

A report that panic attacks are relieved by smoking (*American Journal of Psychiatry* 142:4, April 1985) is supported by several studies that show that smoking relieves anxiety and that such anxiety reduction is the result of nicotine. Recent studies indicate that nicotine gum relieves anxiety, tension, and restlessness associated with tobacco withdrawal, which suggests that nicotine gum could abate panic attacks. If so, nicotine gum treatment could be quite useful because, unlike existing treatments, the side effects of nicotine gum are minor and dependence on the gum is rare. As a first test of this hypothesis, it would be helpful to know of patients with panic attacks who quit smoking by using nicotine gum, and whether the panic attacks decreased while nicotine gum was being used to maintain abstinence. (Auth. Abs. Mod.)

86–1539. Hughes, J.R.; Hatsukami, D. **Short-Term Effects of Nicotine Gum.** In: Grabowski, J.; Hall, S.M. (Editors). *Pharmacological Adjuncts in Smoking Cessation.* U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse Monograph 53, DHHS Publication No. (ADM)85-1333, 1985, pp. 69-81.

Tests of two major hypotheses that might explain the efficacy of nicotine chewing gum in smoking cessation, i.e., that it substitutes for the reinforcing effects of cigarettes or that it relieves tobacco withdrawal symptoms, have shown that nicotine gum decreases both self-reported and observed symptoms of tobacco withdrawal. The most consistent effect is a decrease in irritability/anger/frustration. It is unclear whether the gum reduces other withdrawal symptoms, such as weight gain. Effects on biochemical and physiological indices of arousal appear to be dose dependent: 4 mg gum causes some changes, but 2 mg gum appears to have no significant effect. Many short-term effects are consistent with theories that nicotine dependence plays a role in maintaining smoking. However, other results contradict this hypothesis and crucial tests of the hypothesis have not been reported. Empirical studies are needed that contrast different doses (1 vs. 2 vs. 4 mg nicotine gum), durations of administration (1 vs. 3 vs. 6 months), schedules (fixed time vs. ad lib), or subjects (dependent vs. nondependent smokers).

86–1540. Maheu, M.M. **The Effects of Competition/Cooperation on Worksite Smoking Cessation.** Doctoral Dissertation, California School of Professional Psychology, San Diego, University Microfilms International 85-17936, 1985, 337 pp.

Competition in a worksite smoking cessation program increased participation rates (2.15 vs. 0.43 percent of potential participants) and 3-month cessation rates (78 vs. 59 percent) over those of worksite programs without a competition component. The smoking cessation program, which included behavior modification, smoke-holding, instruction in nicotine gum use, stress and weight control management, relaxation training, the buddy system, and relapse prevention, was offered to employees at two worksites. One worksite utilized a competition component in which prizes were awarded to ex-smokers and nonsmoking employee sponsors. Cessation rates at competition and noncompetition sites were 94 vs. 100 percent at quit day, 78 vs. 76 percent at posttreatment, and 78 vs. 59 percent at 3-month followup. No participants in the competition program relapsed between posttreatment and followup, while 17 percent in the control program relapsed. However, no significant difference was found in abstention rate, number of cigarettes smoked, or breath carbon monoxide levels between groups at followup. Competition may prove more effective for women than for men; 92 percent of women at the competition site and 57 percent at the control site were abstinent at followup. An additional 32 nonparticipant smokers quit smoking as a result of efforts displayed by a family member, friend, or coworker. (Auth. Abs. Mod.)

86–1541. Nemeth-Coslett, R.; Henningfield, J.E. **Rational Basis for Chemotherapy of Tobacco Dependence.** In: Grabowski, J.; Hall, S.M. (Editors). *Pharmacological Adjuncts in Smoking Cessation.* U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse, Monograph 53, DHHS Publication No. (ADM)85-1333, 1985, pp. 15-26.

Nicotine dependence and its implications for use of chemotherapy in treatment of tobacco dependence with respect to cigarette smoking is reviewed. Data indicate that the role of nicotine in cigarette smoking is similar to the role of other constituent drugs of abused substances and, therefore, may be treated similarly by substituting a safer and more manageable form of the drug (i.e., nicotine gum) for the substance of abuse (i.e., cigarettes). The ultimate goal of such an approach is to withdraw the patient from the substituted drug. One implication related to nicotine-based chemotherapy is the role of dose, whether altered by chewing rate or by the amount of nicotine gum that is chewed. Results of preliminary studies revealed that (1) the role of chewing may have functional consequences with regard to the effects produced by the gum, and (2) subjects can tolerate higher chew rates and gum dosage levels than are typically employed in current treatment approaches.

86–1542. Nyborg, K.F. **Partner Support and Type of Treatment as Variables in the Behavioral Treatment of Cigarette Smoking.** Doctoral Dissertation, St. John's University, New York, University Microfilms International 85-08820, 1985, 188 pp.

This investigation of the efficacy and clinical utility of treatment conditions evaluated the role of spouse support as an aid in cessation or reduction of smoking and as a facilitative factor in the maintenance of gains made through behavioral treatment of couples in which both partners smoked. The 80 participants were randomly assigned to a nontreatment (waiting list) control group or to one of four behavioral treatment groups: two multicomponent treatment groups and two minimal treatment groups. Half of the treated subjects were instructed in behavioral couple training techniques that included modeling, monitoring, and reinforcement. Participants in all treatment groups were smoking significantly fewer cigarettes than controls following 8-week treatment, and all were smoking significantly less at 3- and 6-month followup than before treatment. Abstinence rates for all treatment groups were similar to abstinence rates of other studies. Effects of partner support in the maintenance of initial treatment gains were disappointing and indicate a need for future research. Results are discussed in terms of the hypotheses tested, and suggestions for future research are presented. (Auth. Abs. Mod.)

86–1543. Pipp, F.D. **The Effect of Hierarchical Reduction and Relapse Training on Abstinence From Smoking.** Doctoral Dissertation, Wayne State University, Detroit, University Microfilms International 85-14154, 1985, 544 pp.

The efficacy of hierarchical smoking reduction for smoking cessation and cognitive emotional relapse training for maintenance of cessation was investigated in 55 smokers assigned to one of four groups: ascending, problem-solving; ascending, cognitive-emotional; descending, problem-solving; and descending, cognitive-emotional. Smokers in ascending groups were instructed to gradually eliminate smoking starting with the easiest situations; participants in descending groups were to start with the most difficult situations. Problem-solving groups were given relapse training designed to facilitate problem-solving skills for dealing with high-risk situations, and cognitive-emotional groups were given relapse training designed to discover and alter maladaptive cognitions about smoking in high-risk situations. Posttreatment analyses indicated that smoking was reduced in all groups and groups did not differ in number of quitters. Members of problem-solving groups showed less expired carbon monoxide than cognitive-emotional groups. At 3-month followup, groups using descending hierarchy showed lower expired carbon monoxide and reduced smoking. Results showed no effect for problem-solving vs. cognitive-emotional training for relapse prevention and moderate support for using a descending rather than ascending hierarchy in smoking cessation. (Auth. Abs. Mod.)

86–1544. Regal, R.A. **A Dual-Factor Model of Aversion Therapy.** Doctoral Dissertation, Hofstra University, Hempstead, New York, University Microfilms International 85-15207, 1985, 145 pp.

In a test of the hypothesis that long-term behavior change is achievable using aversive techniques if aversive stimuli chosen are strong and perceived to be cross-situationally probable, predictions of significant posttreatment smoking reductions across all groups were confirmed, supporting previous research findings. The 40 volunteers were randomly assigned to (1) the Cancer Sensitization Group (n=9), which emphasized the horrors associated with smoking-related cancers; (2) the Probability Sensitization Group (n=11), which emphasized the increased risks of developing cancer for each smoker; (3) the Cancer and Probability Sensitization Group (n=12), which emphasized both factors; or (4) the Education Control Group (n=8), which did not emphasize either factor. The groups met for two baseline, six treatment, one posttreatment, and two followup sessions. Predictions regarding differential group smoking reductions were not confirmed: the groups remained essentially equivalent throughout the experimental and followup periods. The Eysenck Personality Inventory—Neuroticism scale evidenced a high negative correlation with outcome data. Factors that may have contributed to the absence of differential effects are discussed. (Auth. Abs. Mod.)

86–1545. Russell, M.A.H.; Jarvis, M.J. **Theoretical Background and Clinical Use of Nicotine Chewing Gum.** In: Grabowski, J.; Hall, S.M. (Editors). *Pharmacological Adjuncts in Smoking Cessation.* U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse Monograph 53, DHHS Publication No. (ADM)85-1333, 1985, pp. 110-130.

A brief discussion of smoking as a form of drug dependence provides the theoretical basis for a review of nicotine chewing gum as the first pharmacological approach to smoking cessation with proven efficacy. The theoretical rationale for its use, its mode of action, and various practical aspects involved in effective use in different settings are discussed. Nicotine chewing gum, the most significant single advance achieved in the field of smoking cessation, has a specific effect over and above that of attention-placebo factors. The gum can be used as an adjunct to intensive psychological methods of treatment and to minimal and largely self-help types of intervention. It doubles the success rates achieved by intervention alone, and can be administered effectively by psychologists, family physicians, and other adequately trained health professionals. Furthermore, the rapid and tangible effect of the gum in relieving withdrawal symptoms can boost the morale of both client and therapist. In view of the benefits, it is possible that over a period of years the gum could have a significant impact on national smoking prevalence.

86–1546. Scott, M.; Wood, M.; Raw, M. **A Prospective Study of Belfast's Smoking Cessation Clinic.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 355-358.

Abstinence rates at 1 year among 323 persons who attended a smoking cessation clinic in 1979 were 34 percent for men and 13 percent for women ($p<0.001$); 103 were abstinent and 87 (84 percent) claimed no smoking since treatment. Followup questionnaires were mailed at 3 and 12 months, with a second mailing of the 1-year questionnaire 4 weeks later, and a third mailing after another 4 weeks. The remaining nonrespondents were telephoned or visited where possible. Response to the first 1-year mailing was 55 percent, which rose to 68 percent after the second mailing, and to 72 percent after the third. The final response rate was 88 percent after the telephoning and personal visits. Of the 55 percent who responded to the first 1-year questionnaire, 40 percent (22 percent of the total group) claimed to have been abstinent for a year. Data from followup of the 45 percent who did not return the first 1-year questionnaire increased the overall success rate from 22 percent to 27 percent. Data collected on entry to the clinic showed that (1) the average age of attendees was 35.5 years, (2) average consumption was 26.1 cigarettes/day, (3) 45 percent were men, (4) 52 percent were from social classes I and II, (5) 74 percent were employed (5 percent unemployed, remainder were students, retired, and housewives), and (6) 58 percent were married. It is concluded that complete abstinence since end of treatment (even based on self-report) is a far more stringent criterion of outcome than those generally used and that a long-term abstinence rate of 27 percent should be considered encouraging. It is recommended that clinics conduct several followups to determine abstinence rates over time.

86–1547. Stanton, H.E. **The Relationship Between Hypnotic Susceptibility and Smoking Behavior.** *International Journal of Psychosomatics* 32(4):33-35, 1985.

Hypnotic susceptibility as measured by the Stanford Hypnotic Arm Levitation Induction and Test (SHALIT) is unrelated to a person's success or failure in cessation of smoking. In a conventional clinical setting, 40 fee-paying clients were exposed to a standard 50-minute hypnotherapeutic procedure that included controlled administration of SHALIT, hypnotic induction, positive suggestion, and guided imagery. One year later, patients were asked whether they were smokers or nonsmokers. Results showed 19 successful predictions (i.e., high susceptible patients quit and low susceptibles continued to smoke) and 21 unsuccessful predictions (i.e., high susceptibles continued to smoke and low susceptibles quit). (Auth. Abs. Mod.)

86–1548. Sutton, S.R. **Smoking Intervention at Places of Work Using Motivational Videotapes.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 267-270.

A minimal workplace smoking intervention method utilizing a videotaped interview with a heavy smoker with lung cancer motivated viewers to try quitting, but the sample was too small to show significant short- or long-term success. Provisional results indicated that 40 percent of the 183 persons viewing the film tried to stop smoking compared with 25 percent of 224 persons viewing a control film (e.g., political and commercial aspects of smoking). Participants were followed up at between 3 and 5 months and between 12 and 15 months after watching the videotape. There was some evidence that the film was responsible for the difference in the percentage of people trying to stop smoking, suggesting that the videotape had a motivating effect over and above the control videotape. Regardless of which film was watched, viewers did significantly better than nonviewers, reflecting either a general effect of taking part in the program or preexisting differences between the two self-selected groups in consumption, dependence, and motivation. Because the overall long-term success rate was low, ways of increasing the efficacy of the intervention without unduly increasing the cost should be explored, and it is suggested that the program be supplemented by the offer of nicotine gum.

86–1549. West, R.J.; Russell, M.A.H. **Effects of Withdrawal From Long-Term Nicotine Gum Use.** *Psychological Medicine* 15(4):891-893, November 1985.

Withdrawal from long-term use of nicotine chewing gum can lead to subjective effects similar to those found in cigarette smokers who quit (i.e., increased irritability, difficulty in concentrating, and significant drop in heart rate). Six women (mean age 39 years) who had used nicotine gum for at least a year following successful smoking cessation (mean 13 pieces/day, mean duration 20 months) participated in a clinic program established for withdrawal from 2 mg nicotine gum. The pattern of attendance was one session before and one after 24 hours of withdrawal from 2 mg gum, 1 to 3 weeks of normal chewing, and two further sessions before and after 24 hours of withdrawal. The women were given 0.5 mg nicotine gum to chew during one of the withdrawal periods (three received the gum in the first withdrawal period and the other three in the second period). No gum was provided for the other withdrawal period. Results showed that about the same number of pieces of 0.5 mg gum were consumed as 2 mg gum. Composite subjective withdrawal scores (rated by questionnaire) increased after 24 hours in the 0.5 mg and no gum conditions ($p<0.01$). Half of the subjects experienced such changes as irritability and difficulty in concentrating ($p<0.05$). Heart rate fell during abstinence periods ($p<0.01$). Craving for cigarettes was minimal during withdrawal, indicating a transfer of former dependence on cigarettes to dependence on nicotine gum and suggesting that withdrawal effects are nicotine based. It is noted that the discomfort experienced was not limited to craving for the gum, but paralleled the mood and other changes found in cigarette withdrawal studies.

See also **86–1435, 86–1488, 86–1498, 86–1518, 86–1529**

PASSIVE SMOKING

86–1550. Coultas, D.B.; Samet, J.M. **Passive Smoking and Health. (Letter).** *Western Journal of Medicine* 144(3):350, March 1986.

Passive smoking is an important public health problem because approximately 54 million adults in the United States are smokers. In children, health-related effects of passive smoking include upper airway problems such as irritation, persistent middle-ear effusions, and increased frequency of tonsillectomy and adenoidectomy. Epidemiologic investigations have linked passive smoking to increased occurrences of lower respiratory tract infections; increased cough, phlegm, and wheeze; and to reduced lung function. Evidence is most convincing for lower respiratory tract infections during infancy. Results of longitudinal investigations have shown increased risk of bronchitis and pneumonia during the first year of life among children of smokers. In adults, passive smoking affects the respiratory system and lung function and is a risk factor for lung cancer, but available data do not show a consistent pattern for respiratory symptoms. Reduced flow rates at low lung volumes, suggestive of small airways abnormalities, have been associated with passive smoking. While patients with chronic cardiac and pulmonary diseases may be particularly susceptible to passive smoking effects, little relevant data are available. Passive smoking is a biologically plausible risk factor for lung cancer, although studies linking passive smoking with cancer offer conflicting results because of methodologic constraints, particularly in accurately quantifying exposure.

86–1551. Gale, A.E. **Smokers Have Rights, Too. (Letter).** *Medical Journal of Australia* 143(7):317-318, September 1985.

Exception is taken to the publication of an editorial about smokers' rights (*Medical Journal of Australia* 143:62, July 22, 1985), which also discussed (inaccurately) allergy to smoke. It would be more relevant to recall that (1) an individual who spends 8 hours/day in a smoky environment may inhale cigarette smoke equivalent to actively smoking five cigarettes; (2) the degree of passive smoking can be evaluated by urinary excretion of cotinine; and (3) cigarette smoke and air pollutants can affect mucociliary transport along the tracheobronchial tree. In light of these facts and the current concern about the adverse effects of passive smoking, it would have been more appropriate to allocate space for a serious review of the scientific evidence of the adverse effects of passive smoking in both the normal person and in the sufferer of respiratory disease. Chronic exposures to cigarette smoke and submicrometer H_2SO^4 can result in more variable rates of mucus clearance and persistent changes in clearance rates, which may predispose the individual to chronic bronchitis, or initiate the sequence of changes leading to its development. Tobacco smoke is carcinogenic. Investigations in a climatic chamber showed that tobacco smoke irritates the eyes of up to 20 percent of healthy people.

86–1552. Karlsson, Y. **En Arbetsmiljofraga att ta pa Allvar Dags att Tillampa rad om Begransning. [A Work Environment Question to Be Taken Seriously. Time to Apply Restriction Rules.]** *Lakartidningen* 83(3):131-133, January 15, 1986, Swedish.

Of seven health care professionals who were asked about a recent decision in Sweden in favor of a passive smoker who sought compensation for lung cancer as a work-related injury, the scientific evidence correlating passive smoking and lung cancer was regarded as rather strong by five, rather weak by one, and not strong but sufficient to justify creation of smoke-free work environments by one. Negative health effects of passive smoking were considered very significant by one, and less so by the others. All agreed on the significant negative effects of smoking on fetuses and young children, including low birth weight, premature embryonic membrane rupture, increased meconium necessitating cesarean section, low maternal hemoglobin levels, increased risk of maternal endometriosis and infection, throat problems, and allergies in exposed children. All agreed that passive smoking can cause or accelerate development of lung cancer, but the degree of risk was unknown. Three respondents favored banning processes, including smoking, in workplaces that produce carcinogenic substances. The other four favored other types of prevention. According to the Swedish Minister of Labor, the harmful effects of passive smoking must be restricted and existing rules enforced. Of the 80 percent of public workplaces that have some form of smoking restriction, only 20 percent strictly enforce the rules.

86–1553. Moorhead, R. **Passive Smoking and Young Children's Health.** *Australian Family Physician* 14(10):1058-1059, 1061-1062, October 1985.

Upper and lower respiratory disease, conjunctivitis, otitis media, infectious disease, and accidents were more prevalent among children of smokers than children of nonsmokers. Children 5 years of age or younger, from families matched by age, sex, social class, and size, were divided into 2,243 exposed to passive smoking and 1,614 nonexposed. Over an 18-month period, children of smokers consulted doctors more often and spent more days in the hospital. Children of smokers had more consultations (mean 7.6 vs. 5.9) and diagnoses (9.6 vs. 7.1) than children of nonsmokers. The mean was higher for respiratory (4.1 vs. 3.0), nervous and sense organ, infectious, preventive, and accident groupings. Means were 2.4 vs. 1.8 for upper respiratory tract infection and pharyngitis, 1.5 vs. 0.9 for otitis media, 0.8 vs. 0.4 for vaccinations, and 0.7 vs. 0.3 for gastroenteritis. Otitis media (tracer disease) was expected to express itself equally in both groups, but was more prominent in children of smokers. A dose—response relationship was found, suggesting an actual effect of sidestream smoke, possibly altering the immunoglobulin E antibody on the eustachian tube mucosa or the increase of upper respiratory infection. Tonsillitis, scarlet fever, wheezing, and conjunctivitis were also diagnosed more often in children of smokers. Larger studies in a primary care setting are strongly recommended.

86–1554. Olson, J.W. **Chronic Cigarette Sidestream Smoke Exposure Increases Rat Trachea Ornithine Decarboxylase Activity.** *Life Sciences* 37(23):2165-2171, December 9, 1985.

Long-term exposure to sidestream (SS) cigarette smoke increased rat trachea ornithine decarboxylase (ODC) activity in male rats exposed once/day for 10 minutes to mainstream (MS) or different SS dilutions of fresh Kentucky 2R1 cigarette smoke or air (sham) for 4, 8, or 20 weeks to determine the effect of chronic cigarette smoke exposure on activity of rat trachea and lung ODC and S-adenosyl-methionine decarboxylase (AdoMet-DC). Exposure for 8 weeks to MS smoke significantly increased lung and trachea ODC activity; exposure to all dilutions of SS caused significant increases in trachea ODC activity, but did not influence lung ODC activity. The significance of the observed activation of respiratory tract ODC by cigarette smoke inhalation is not currently known; however, the increase in ODC activity may play an important role in development of certain pneumotoxicities associated with chronic smoke exposure. Results are intriguing in view of concerns that passive smoking may be associated with serious health problems. (Auth. Abs. Mod.)

86–1555. Reineking, A.; Becker, K.H.; Porstendoerfer, J. **Measurements of the Unattached Fractions of Radon Daughters in Houses.** *Science of the Total Environment* 45:261-270, October 1985.

Radon activity measurements carried out in rooms of houses in southern Germany with radon activity concentrations in the range of 150 to 900 Bg/m^3 revealed that the fraction of unattached radon daughters (f_p) in low and moderately ventilated rooms without aerosol sources are higher ($f_p = 0.05$ to 0.18) than proposed in the literature; additional aerosol sources such as cigarette smoke, cooking, or stove heating lead to a decrease in the f_p value below 0.05. In rooms with cigarette smoke during smoking and low ventilation rates, f_p values ranged from 0.01 to 0.04. These values remained essentially unchanged 30 to 300 minutes following smoking. Overall data indicate that measured f_p values depend more on the attachment rate than on the aerosol concentration. This is due to the great change in the particle size distribution of the indoor aerosol produced by different aerosol sources in homes. Aged cigarette smoke showed approximate attachment coefficients of 12.0×10^{-3} cm^3/hour and diameters of approximately 160 nm.

86–1556. Shimp, D.M. **Non-Smokers' Health Rights From 1976 to Today: A Plaintiff's Perspective.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 603-606.

In 1976, a landmark case was settled in favor of a nonsmoker. Today (1) more doctors are aware of the hazards of passive smoking and are willing to be advocates for their patients; (2) more medical organizations are helping to diminish the role of tobacco in society; (3) more lawyers are initiating actions against the tobacco industry on behalf of clients; (4) some health groups, such as the American Cancer Society, are joining the fight; and (5) a large number of well-directed groups throughout the world are bringing about social change through a wide variety of programs and can assist the nonsmoker with a specific problem. The most important change, however, is in attitude: more groups are willing to work together, to share information, and to focus on mutual needs. The majority of people feel public smoking should be restricted, especially in the workplace, and management is responding. Antitobacco legislation is now being actively supported, but the tactics used by tobacco interests and the irresponsible statements being made must be refuted, in a continuing effort to blunt the skillful advertising campaigns. The tobacco industry spends billions of dollars to lure young people into lifelong nicotine addiction and to help support the habit of those already addicted. Among the courses of action now open to a potential plaintiff today are civil action, discrimination suits, State laws for the handicapped, recovery of medical expenses and some award for permanent damage through workmen's compensation, disability payments and retirement pension, unemployment compensation when forced to resign from a job, and emotional distress damage suits.

86–1557. Soto, M.E.; Sly, P.D.; Uren, E., et al. **Bronchodilator Response During Acute Viral Bronchiolitis in Infancy.** *Pediatric Pulmonology* 1(2):85-90, March-April 1985.

When acute bronchiolitis (as a result of respiratory syncytial virus infection) was examined in 50 infants of smokers and nonsmokers, it was found that infants whose mothers were habitual smokers had reduced specific conductances compared with infants of mothers who did not smoke (0.12 ± 0.03 vs. 0.14 ± 0.04, $p < 0.05$). When bronchodilator responsiveness was assessed by measuring specific respiratory conductance before and after inhalation of aerosolized bronchodilator, 30 percent of the infants showed improvement in specific conductance. Responders could not be differentiated from nonresponders by family histories of atopy, eosinophil counts, or immunoglobulin levels in blood and nasal secretions. Data on smoking habits showed that in 83 percent of families, one or both parents smoked (the majority regular to high-tar cigarettes); 54 percent of mothers were habitual smokers; and 52 percent of the mothers had smoked during pregnancy (most >20 cigarettes/day). Birth weights of infants of smokers were similar to those of nonsmokers, and no significant differences were found in family smoking habits between responders and nonresponders. Further studies are needed to determine whether the responders in this subgroup of bronchiolitis patients are more at risk of subsequent development of wheezing and/or chronic lung disease. (Auth. Abs. Mod.)

86–1558. Spinaci, S.; Arossa, W.; Bugiani, M., et al. **The Effects of Air Pollution on the Respiratory Health of Children: A Cross-Sectional Study.** *Pediatric Pulmonology* 1(5):262-266, September-October 1985.

Parental cigarette smoking was related to a decline in forced expiratory volume in 1 sec (FEV_1) and to increased incidence of acute respiratory illnesses and chronic cough in children. Indoor and outdoor air pollution effects on 2,385 children living in central urban, peripheral urban, and suburban areas were evaluated from questionnaires completed by mothers, interviews with children, and physicial examinations. General linear model analysis used lung function values as dependent variables. Independent variables included geographic area, sex, age, height, body weight, active or passive smoking (including number of cigarettes/day), socioeconomic status, central heating, type of stove, and exhaust hood. The number of cigarettes smoked by both father and mother had a significant negative effect on rate of cough with colds ($p < 0.01$) and acute respiratory illness ($p < 0.01$). Although boys had higher lung volumes and lower air flow, regression analysis showed no significant influence of sex and geographic area or sex and smoking. Sulphur dioxide and total suspended particle concentrations in all areas showed pollutant concentrations in central and peripheral urban areas above commonly accepted safety levels for respiratory health, but concentrations in suburban areas were within acceptable limits. Results showed that children from both urban areas had reduced pulmonary function and higher prevalence of bronchial secretion with common colds than those from the suburban area. (Auth. Abs. Mod.)

86–1559. Shopland, D.R. **Passive Tobacco Smoking Policies Indoors in Various U.S. States.** In: Walkinshaw, D.S. (Editor). *Indoor Air Quality in Cold Climates. Hazards and Abatement Measures.* Proceedings of Air Pollution Control Association Specialty Conference, Ottawa, Canada. Health and Welfare Canada, April 1985, pp. 504-522.

Smoking control, restriction, or prohibition (commonly known as "Comprehensive Clean Indoor Air Acts") exists to some extent in most States. In contrast, only nine States have enacted legislation to protect the rights of nonsmokers in the workplace (California, Hawaii, Maine, New Jersey, and Alaska cover only State employees; Minnesota, Utah, Nebraska, and Connecticut protect all nonsmokers in the workplace). California has placed the question of nonsmokers' rights on a statewide ballot on two separate occasions. California is also unique in that most local jurisdictions have comprehensive legislation going beyond that proposed by the State, attributed to the aggressive actions of organized nonsmokers. However, the most comprehensive State law to protect nonsmokers from passive smoke exposure was enacted by Minnesota in 1975. Today it is still considered the standard or model for other States. The law appears to be self-enforcing and infractions seldom occur. Twenty-four States limit or restrict smoking in public transportation; 21 restrict or ban smoking during public meetings; and more than half restrict smoking within health care facilities. Eleven States require separate seating for nonsmokers in restaurants, and 10 States address smoking in places of retail sales.

86–1560. Welliver, R.C.; Wong, D.T.; Sun, M., et al. **Parainfluenza Virus Bronchiolitis. Epidemiology and Pathogenesis.** *American Journal of Diseases of Children* 140(1):34-40, January 1986.

Findings indicate that lower respiratory tract infections in infants may predispose to episodes of bronchoconstriction on subsequent exposure to cigarette smoke or other viral infections. First infections with PV occurred at the same age in infants with upper respiratory tract infections and those with bronchiolitis, and no significant effect of exposure to cigarette smoke on development of bronchiolitis was observed. However, once an episode of bronchiolitis had occurred, exposure to cigarette smoke was associated with a significantly increased number of recurrent wheezing episodes. Breast-fed infants experienced significantly fewer recurrent wheezing episodes compared with formula-fed infants (1.3 ± 0.8 vs. 3.1 ± 1.4, $p < 0.01$). When only formula-fed infants were considered, infants exposed to cigarette smoke had an average of 3.2 ± 1.5 recurrent episodes of wheezing, while those not exposed to passive smoke had 1.8 ± 1.2 recurrent episodes ($p < 0.05$). When only those infants who were exposed to cigarette smoke in the home were considered, the effect of breastfeeding on frequency of recurrent wheezing did not approach statistical significance. Data suggest that PV infections of the terminal airways may sensitize the host to episodes of airway obstruction on subsequent exposure to environmental irritants such as cigarette smoke. (Auth. Abs. Mod.)

SMOKELESS TOBACCO

86–1561. Adhvaryu, S.G.; Bhatt, R.G.; Dayal, P.K., et al. **SCE Frequencies in Lymphocytes of Tobacco/Betel Nut Chewers and Patients With Oral Submucous Fibrosis.** *British Journal of Cancer* 53(1):141-143, January 1986.

Sister chromatid exchange (SCE) frequencies were studied in untreated and mitomycin C-treated lymphocyte cultures from 10 patients with oral submucous fibrosis (SMF) and a history of tobacco/betel nut/lime chewing, 10 chewers matched for frequency and duration of use who were free of any change in oral mucosa, and 15 controls who did not consume tobacco or betel nut in any form. At baseline, mean SCEs/cell were 7.40 for normal chewers, 7.89 for SMF patients, and 6.16 for controls ($p<0.001$). Among controls, only one person had >7.0 SCEs/cell compared with seven normal chewers and nine SMF patients. Mitomycin C-induced mean SCE/cell value was 24.00 for SMF patients, which was significantly higher than the 20.60 SCE/cell for controls ($p<0.01$) and the 21.22 SCE/cell among normal chewers ($p<0.02$). For SMF patients and normal chewers, 16.0 and 11.5 percent of total metaphase cells, respectively, had greater than 10 baseline SCEs compared with only 3.5 percent in controls. For mitomycin C-treated cultures, SMF patients had 37.0 percent cells with >25 SCEs compared with 13.0 and 20.0 percent, respectively, for normal chewers and controls. Higher baseline SCE rates in normal chewers and SMF patients are attributable to the genotoxic effects of tobacco and betel nut alkaloids. Further research is needed before any conclusions can be drawn about involvement of susceptibility to tobacco/betel nut-induced changes in oral SMF patients.

86–1562. Bickers, C. **RJR's Chewing Products: Into the Cuspidor of History?** *Tobacco International* 187(25):18-20,22, December 1985.

R.J. Reynolds ended the company's 100-year involvement in production of plug chewing tobacco (including all other chewing products and most other smoking tobacco products) and will concentrate on manufacture and sale of cigarettes. Reasons cited were excess inventories and corporate efficiency, but excise tax increases on chewing tobacco and snuff and attacks from health activists who believe such products cause oral cancer and other illnesses may be the main factors. As recently as 2 years ago, Reynolds was still hoping to introduce a moist snuff product (Timberline) into a market that has grown dramatically in the last 10 years. But in test marketing, the product failed to a achieve a significant market share and was canceled. Farmers who grow tobacco for such products face a lean marketing year, and are planning cutbacks in future production. However, the loss does not appear to have affected burley production.

86–1563. Chwat, J. **FTC's Wilkenfeld on Labeling for Cigarettes and Smokeless Tobacco.** *Tobacco International* 188(2):16, 18-19, January 1986.

In January 1985, the Federal Trade Commission (FTC) requested the Surgeon General to "conduct a comprehensive review of the scientific evidence on the health effects of smokeless," specifically, the range of possible health effects associated with each smokeless tobacco product and an assessment of the strengths and weaknesses of the supporting data. The FTC has a broad range of policy options that can be used to deal with the issue, including developing a legislative proposal or a rulemaking proceeding as requested by the petitioning Health Research Group of Public Citizens. The FTC is also conducting research on consumer usage patterns and knowledge of health risks associated with smokeless tobacco use. Both houses of Congress have considered several bills that would require warning labels on smokeless tobacco packages and health warnings in advertisements and calling for either a ban on television and radio advertising or some other restriction. If passed, the laws would be implemented by the FTC. All 6 major and 19 smaller tobacco companies have complied with the labeling requirements of the 1984 Comprehensive Smoking Education Act, although small manufacturers and importers are being allowed to display all warnings simultaneously (delaying compliance with quarterly rotation requirements until January 11, 1986).

86–1564. Glover, E.D. **Smokeless Tobacco: A Future Health Concern for North Carolina. (Letter).** *North Carolina Medical Journal* 46(10):549-550, October 1985.

Moist snuff sales increased 55 percent from 1978 to 1984 and sales of U.S. tobacco more than quadrupled between 1973 and 1984 (from 94.3 million dollars to 443.7 million dollars). It is estimated that there are 22 million smokeless tobacco users in the United States and the greatest demand is among those aged 18 to 30 years. A careful review of North American medical and dental literature disclosed 646 documented cases of oral, pharyngeal, or laryngeal cancer linked to smokeless tobacco use. A 1985 prevalence study in one North Carolina county indicated 15 percent (14,550 residents) use smokeless tobacco. It is recommended that North Carolina physicians support (1) implementation of warning labels on smokeless tobacco containers; (2) development of a smokeless tobacco cessation model for those currently addicted; (3) support health education in public schools regarding dangers associated with use of smokeless tobacco beginning with children aged 7 to 8 years; and (4) enforcement of laws restricting minors from purchasing/selling smokeless tobacco products. (Auth. Abs. Mod.)

86–1565. Glover, E.D.; Johnson, R.; Laflin, M., et al. **Smokeless Tobacco Use Trends Among College Students in the United States.** *World Smoking and Health* 11(1):4-9, Spring 1986.

The National Collegiate Smokeless Tobacco Survey found that 12 percent of more than 2,000 students dipped or chewed tobacco and 8 percent planned to dip or chew in the future. Among the predominantly male users, 8 percent had fathers who dipped or chewed tobacco, 45 percent had a few friends who used smokeless products, and 19 percent had several friends who were users. Among the 14 percent who were current smokers, 33 percent had fathers, 25 percent had mothers, 25 percent had brothers, and 20 percent had sisters who were smokers. Only 17 percent reported that none of their friends were smokers and 8 percent planned to smoke in the future, for a possible 22 percent prevalence. Tobacco dippers/chewers consumed less than one can or pouch/week. Smoker consumption rates were 1 to 5 cigarettes/day (5 percent), 6 to 10 cigarettes/day (3 percent), 11 to 20 cigarettes/day (4 percent), and >20 cigarettes/day (2 percent). Among smokeless tobacco users (1) 41 percent believed the habit was very harmful, 42 percent believed it was somewhat harmful, and 54 percent thought it was less harmful to health than smoking; (2) 90 percent believed dipping and chewing could harm teeth, gums, or mouth; and (3) 79 percent indicated the habit could cause cancer.

86–1566. Harris, M.A. **What Could Burn the King of Smokeless Tobacco.** *Business Week* pp. 86, March 17, 1986.

Legislation that requires health warnings on snuff and smokeless tobacco products and will soon ban broadcast advertising may have a heavy impact on the enviable record of growth and profitability of the U.S. Tobacco Company, which gets 75 percent of its revenue from the sale of smokeless tobacco products. In 1971, when the Government supplemented warning labels on cigarettes with a ban on broadcast advertising, smokeless tobacco was left unrestrained. A campaign promoting Skoal and Copenhagen as an alternative to smoking helped the company record the fattest profit margin of any industrial company of its size or larger. Since the new health labeling legislation, however, sales have begun to slip, falling 2 percent in the final quarter of 1985, a drop attributed to bad publicity from pending State and Federal legislation. Stock prices are off despite a bull market, and several liability suits against the company are pending. The number of States taxing snuff increased to 22 in 1984 as a result of pressure from health professionals. Although legislation may make it tougher to convert smokers and nonsmokers to snuff, the law may actually help U.S. Tobacco maintain its 90 percent share of the 600 million dollar market by making it harder for rivals to lure away customers.

See also **86–1477, 86–1493**

86–1567. Journal of the American Medical Association. **Health Effects of Smokeless Tobacco.** *Journal of the American Medical Association* 255(8):1038-1044, February 1986.

The adverse health effects related to use of snuff and chewing tobacco should be made known, according to the Council on Scientific Affairs of the American Medical Association (AMA). Pharmacologic and physiologic effects of snuff and chewing tobacco include cardiovascular, endocrinologic, neurologic, and psychological complications associated with nicotine. Data from studies involving various populations and approaches indicate that use of snuff or chewing tobacco may affect reproduction, longevity, and oral health. The AMA also recommends that (1) well-planned studies be conducted by voluntary and federally funded organizations to further define the risks associated with snuff and chewing tobacco, including the risk of developing cardiovascular disease; (2) the requirements and restrictions on advertising of cigarettes be applied to snuff and chewing tobacco; and (3) the council periodically monitor and report on the growing evidence concerning the risks of using snuff and chewing tobacco. The AMA, which opposes advertising and promotion of tobacco products, is lobbying for legislative action to achieve this goal.

86–1568. Journal of the American Medical Association. **Health Applications of Smokeless Tobacco Use.** *Journal of the American Medical Association* 255(8):1045-1048, February 1986.

Of 10 million Americans who use smokeless tobacco, 3 million are under 21 years of age. Data have shown that (1) 16 percent of boys between 12 and 17 years of age use smokeless tobacco (one-third of these use it more than once/week); and (2) smokeless tobacco is used by 20 percent of college males, 30 to 40 percent of high school males, and 13 percent of third grade males. Although there is evidence of increased risk of oral cancer from smokeless tobacco use, data are insufficient to link use with cancers at sites other than the mouth and throat. Evidence supports an association between smokeless tobacco use and gingival recession and oral leukoplakia, but is insufficient to support an association with periodontitis or tooth decay. Recommendations include (1) longitudinal studies on prevalence of smokeless tobacco use; (2) incidence of periodontal diseases, caries, leukoplakia, and cancer in smokeless tobacco users; (3) studies of cancer sites other than the mouth in areas of high smokeless tobacco use; (4) role of smokeless tobacco in cardiovascular disease and adverse outcomes of pregnancy; (5) smokeless tobacco use and in vivo nitrosamines; and (6) smokeless tobacco use and plasma levels of lead, cadmium, and other potential toxins. Prevention and intervention programs are also recommended.

TOBACCO PRODUCT ADDITIVES

86–1569. Hall, J.B.; Yoshida, T. **Use of Pentamethylindanol Derivatives in Augmenting or Enhancing the Aroma or Taste of Smoking Tobacco Compositions or Smoking Tobacco Articles.** United States Patent No. 4,576,186, March 18, 1986, 31 pp.

Tertiary pentamethylindanol derivatives used to enhance tobacco or substitute tobacco with woody, Oriental, and Turkish aroma and taste prior to and during smoking in both mainstream and sidestream smoke are described. An aroma or flavor additive containing one of two tertiary pentamethylindanol derivatives as an active ingredient can be added to smoking tobacco or suitable substitutes (i.e., lettuce leaves), or mixed with other flavor and aroma additives. The derivatives can be added also to cigar or pipe tobacco or smoking tobacco products formed from sheeted tobacco dust or fines, or incorporated into filter tip materials, seam paste, and packaging materials used to form products for smoking. Proportions of additives can be varied according to taste. (Auth. Abs. Mod.)

86–1570. Heyzer, E. **Tropical Fruit Flavours for Kreteks and Cigarettes.** *World Tobacco* 92:20-21, March 1986.

The experimental use of tropical fruit flavors in kreteks was a natural process, since this basically tobacco-clove blend cigarette is almost exclusively a product of Indonesia, where such flavors are part of a distinctive Indonesian cuisine and culture. In the past 7 years, the tobacco industry in Indonesia has experimented with many tropical fruit flavors for tobacco, especially in kretek manufacture. All odor profiles are generated as a result of organic substances and impurities (volatile and semivolatile components) and nonvolatile components. In nature, the biochemical pathways in one living organism can be similar to those in another, and it has been found that the biochemical pathways in flue-cured tobacco have some similarity to those in pineapple, lychee, and coconut. Examples of chemical components that have been identified in tropical fruits and in tobacco are listed, as are the end-product uses of the aromas or juices of some tropical fruits. The ingredients and taste and aroma profiles for jack-fruit-flavored and pineapple-flavored cigarettes. It is noted that whatever the flavor, the objective must be to produce what the smoker wants in a cost-effective manner.

86–1571. Wu, D.L.; Swain, J.W. **Cooked Flavors for Smoking Products.** United States Patent No. Re. 32,095 (Reissue of No. 4,379,464, April 12, 1983), March 25, 1986, 5 pp.

The method described utilizes reducing sugars reacted with ammonium hydroxide or ammonium salts and trace amounts of amino acids to enhance the flavor and aroma of tobacco with a high stem content. Tobacco stems and midribs generally represent the unsatisfactory portion of cured tobacco leaf, producing a stemmy taste and lacking aroma of tobacco lamina. The cooked mixture is particularly suitable for use in cigarettes with up to 50 percent blends of tobacco stems, but is also applicable to smoking materials selected from tobacco leaf, reconstituted tobacco, nontobacco smoking substitutes, and combination mixtures.

TOBACCO MANUFACTURING AND PROCESSING

86–1572. Adams, P.I.; Bryant, R.A.; Knapman, W. **Tipping Assembly for an Elongate Smoking Article.** United States Patent No. 4,587,982, May 13, 1986, 8 pp.

The method described for manufacturing cigarette tipping assemblies is simple and economical, and is easily adjusted to vary ventilation. The cylindrical filter element is wrapped in a ventilated tipping enclosure spaced from the filter element by a raised pattern of thermoplastic material printed on the inner surface of the wrapper. The pattern provides air channels to ventilations in the wrapper and to the mouth end of the filter. The device simplifies manufacture by dispensing with a separate spacing member between the filter and tipping wrapper. (Auth. Abs. Mod.)

86–1573. Coffman, P.M. **Tobacco Filters and Method for Producing Same.** United States Patent No. 4,579,130, April 1, 1986, 8 pp.

A process for producing cigarette filters with fiber adhesion properties, which enables substantially broader temperature melt fusion operating ranges, is described. Crystalline propylene polymer combined with a second crystalline polymer is extruded into fibers that are heated to a temperature above the original melting point of the second crystalline polymer and below the original melting point of the crystalline propylene polymer. Fibers are twisted and/or crimped to effect the desired adhesion and formed into filter rods of increased cohesiveness. The operating range of temperatures is broadened from 3 to 4° C to 40° C, resulting in increased ease of operation and more effective fusion between polymers. The process improves and simplifies current methods of manufacturing filters. (Auth. Abs. Mod.)

86–1574. Deal, P.A. **Variable Air Dilution Cigarette Filter.** United States Patent No. 4,576,187, March 18, 1986, 9 pp.

The variable air dilution cigarette filter described consists of a slender and rigid cylindrical sleeve with internal retention steps or barbs, each with one or more air passing slots or perforations. A filter rod with a filter wrap is inserted within the cylindrical tube or sleeve and held in place by the retention steps. Rotation between the sleeve and filter rod varies the amount of smoke-diluting air allowed to pass through the slots in the sleeve and through the filter rod. The tobacco rod is joined to the sleeve by tipping paper to produce the variable air dilution cigarette filter assembly. (Auth. Abs. Mod.)

86–1575. Grollimund, E.C. **Expanded Web of Sheet Material and Method of Making Same.** United States Patent No. 4,585,016, April 29, 1986, 9 pp.

A composite expanded web for making cigarette wrappers consists of a laminate of generally flat sheet material and a second layer of expanded sheet material, which is formed by passing a web of sheet material through rotary shearing and forming dies to impart a configuration of longitudinally disposed rows of sinusoidal convolutions extending above and below the original plane, each row of convolutions lying 180 degrees out of phase with abutting rows. The composite web is formed into a wrapper for a smoking article through curling about its longitudinal axis, securing the overlapping edges of the first web with a glue seam, and cutting it to desired length. The wrapping material allows gas flow permeability along its longitudinal axis, providing variability in regulation of smoke dilution. (Auth. Abs. Mod.)

86–1576. Rainer, N.B.; Siwiec, D.M. **Process for Increasing the Filling Power of Tobacco.** United States Patent No. 4,574,819, March 11, 1986, 5 pp.

A process for increasing filling power by supersaturating cut tobacco with aqueous calcium citrate and drying it through heating is described. During curing, moisture content of tobacco leaves is greatly reduced, resulting in leaf structure shrinkage and decrease in filling power. Additionally, shredding and cutting methods employed to convert cured tobacco leaves into filler may laminate and compress tobacco, further decreasing filling power. A higher filling power permits a lower weight of tobacco to produce a cigarette rod of a given circumference and length. The process can be used with either cased or uncased tobacco and either before or after treatment. Calcium citrate (preferably 1 to 3 percent, dry weight) can be applied to the tobacco while it is dispersed in a casing solution. The treated tobacco may be used separately or combined with other tobaccos to produce a blend. Calcium citrate does not detract from the tobacco taste, based on subjective evaluations.

86–1577. Reynolds, M.L.; Frank, D.M.; Riehl, T.F. **Cigarette Filter.** United State Patent No. 4,580,584, April 8, 1986, 8 pp.

The cigarette filter described is designed with capillary smoke flow action to lower tar intake by ventilation and filtration. The ventilation system utilizes filter plug grooves that extend from tipping paper perforations to the mouth end of the cigarette. The filter rod is encased in nonporous wrapping, permitting grooves to be formed longitudinally from one end to a preselected distance, preferably extending from the mouth end of the filter rod. Tipping material perforated to permit smoke flow from the groove is layered over the nonporous wrapper. Several design possibilities are described. (Auth. Abs. Mod.)

86–1578. Sakai, T.; Maeda, K.; Kawabata, M., et al. **Tobacco Smoke Filter.** United State Patent No. 4,583,560, April 22, 1986, 10 pp.

The tobacco smoke filter described provides less inhalation drag, the feeling of ample smoke inhalation, and the impression of mildness without restricting inhalation. The filter also reduces the amount of particulate and gaseous vapor components in smoke that enters the mouth. The corrugated tape-like wrapping, together with an outer perforated or otherwise air-permeable paper, defines a set of longitudinal grooves. Each groove is blocked to inhibit direct smoke flow through the grooves, thereby creating a ventilation effect. The blocking members in each groove are longitudinally staggered to simplify production methods. (Auth. Abs. Mod.)

86–1579. Sanford, R.A. **Cigarette Filter.** United States Patent No. 4,582,072, April 15, 1986, 8 pp.

The cigarette filter described provides normal cigarette pressure drops with low to high efficiency filters and lowers tar intake by ventilation and filtration. The ventilation system utilizes grooves extending from perforations in the tipping paper to the mouth end of the filter. A porous rod is equipped with a capillary smoke passageway and a hollow, cylindrical mouthpiece. By enclosing the filter rod in a nonporous wrapper, grooves are created from the mouth end to a preselected point. The mouthpiece forms air flow channels along the grooves of the filter rod, and smoke flow channels between adjacent grooves of the filter rod. Filter and mouthpiece are wrapped in tipping material, creating flow-through openings in flow communication with the grooves. (Auth. Abs. Mod.)

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86–1580. Silberstein, D.A. **Cigarette Filter.** United States Patent No. 4,585,015, April 29, 1986, 6 pp.

The cigarette filter described, which provides a pressure drop similar to that of conventional cigarettes, lowers tar intake by ventilation and filtration. The filter contains a porous filter rod with a channel extending longitudinally through the rod. The end of the filter at the tobacco column includes a partition with an orifice designed to enhance the flow of smoke between the tobacco column and channel. The partition directs the flow from the tobacco column into the filter, where it is diluted by air entering through air-permeable material enclosing the filter rod. (Auth. Abs. Mod.)

86–1581. Simkanich, J.J. **Check Valve Type Cigarette Mouthpiece.** United States Patent No. 4,582,073, April 15, 1986, 5 pp.

The check valve mouthpiece described is designed for use with self-extinguishing filter or nonfilter cigarettes. The design provides a safe, self-extinguishing cigarette that will not continuously burn when left unattended (chimney effect). The valving mouthpiece is designed to cut off the flow of gases and smoke in the absence of a negative pressure created by a smoker's drawing action. A method for incorporating the valving mechanism in a filter is also described.

86–1582. Westcott, D.T.; Evans, N.; Milsom, K. **Tipping Assembly for an Elongate Smoking Article.** United States Patent No. 4,582,071, April 15, 1986, 19 pp.

A cylindrical ungrooved filter plug for a cigarette is described. The plug is surrounded by ventilated tipping wrapper spaced radially from the plug by a slotted sheet laminated to the inner surface of the tipping paper. The slots connect to ventilated portions of the tipping wrapper and provide channels extending to the mouth end of the plug. The tipping assembly in combination with a filter plug can be modified to vary ventilation characteristics and to bring ventilating air to a smoker's mouth by a variety of routes as desired, depending on the grade and quality of tobacco or other smoking material used, without the necessity of redesigning or altering the plug itself. It is claimed that the design controls smoke particulate matter by ventilation and filtration.

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86–1583. Ahmad, M. **Good Crop, Biggest Since '71; Long Price War Hurting Manufacturers.** *Tobacco International* 188(1):5, 7-8, January 1986.

Pakistan's 1985 tobacco crop, the biggest since 1971, was 18 percent larger than the previous year, resulting in surplus stocks of good quality flue-cured Virginia, sun-cured rustica, and air-cured Virginia. Overall production included flue-cured Virginia (36.5 million kgs), air-cured Virginia (10.5 million kgs), sun-cured rustica (23.25 million kgs), fermented rustica (3.50 million kgs), and burley (0.40 million kgs). Of the 25 cigarette manufacturing companies operating in Pakistan in 1984, 20 engaged in cutthroat competition to maintain market shares, launching 23 new cigarette brands or versions of old brands (mostly low-priced filter brands) in 1984-1985. The filtered cigarette is the fastest growing type in Pakistan. Total cigarette production in 1984 was 40.6 billion pieces, contributing 7,000 million Rs to the national exchequer in excise taxes and customs duties on imports, and in income taxes. Production between January and June 1985 was only 18.8 billion pieces, and a further decline is anticipated for the rest of the year. Approximately 2 billion kgs of tobacco leaf were imported in 1984. Cigarette exports in 1984 increased 46 percent over 1983.

86–1584. Ahmad, M. **Leaf Situation in China.** *Pak Tobacco* 8(1):23-25, January 1984.

The People's Republic of China is the world's largest producer, manufacturer, and consumer of tobacco and tobacco products. The China National Tobacco Corporation (CNTC), formed in January 1982, consolidated, reorganized, and modernized the tobacco industry. CNTC sets prices, handles purchases and distributions, organizes production and sales, issues licenses, controls exports and imports, and negotiates with foreign suppliers (e.g., agreements with Philip Morris and R.J. Reynolds to set up modern cigarette plants at Shenzen in Guangdong Province and Xiamen in Fujian Province, respectively). Henan, Shangong, Yunnan, and Ghizhou provinces are the major producers of flue-cured tobacco. Burley is grown in Hubei and Sichuan provinces, and Oriental in Zhejiang province. China uses 15 classes for grading flue-cured tobacco, based on plant position, color, and other characteristics. Henan tobacco has the lowest nicotine content (0.5 to 1.5 percent); Yunnan tobacco is known for its golden color, good flavor, and medium nicotine content; and Shandong tobacco has a nicotine content of 1.2 percent and a tar content of 2.0 percent. Cigarette quality is judged by its Yunnan tobacco content. Although some tobacco is imported, China has not entered the world export market, preferring to adjust supply and demand internally.

86–1585. Ali, S.R. **Excise Down, So Duty Up; PTB Has Approval Mandate; Khyber on Strike.** *Tobacco International* 188(1):10-11, January 1986.

Tobacco surpluses from overproduction in previous years have prompted the Pakistan Tobacco Board (PTB) to impose a ban on new tobacco purchases without PTB approval to scale down the 1986 crop. Projected requirements for flue-cured Virginia, air-cured Virginia, and white patta are down by 20, 76, and 43 percent, respectively. Domestic sales of cigarettes were down 5 percent during 1984 and 1985. A regulatory duty on cigarettes to offset the decline in revenue has been imposed by the Government. The 20 percent decline in excise duty on cigarettes between July and December 1985 was attributed to price reductions of certain brands. The Government increased the retail price ceiling of the lower slab 2 years ago, and to compensate, larger manufacturers rolled back retail prices of popular brands, spurring an increase in sales. Under the law, the Government has the power to impose a regulatory duty that cannot exceed 40 percent of existing duty or 10 percent of value. The Government intends to impose an additional regulatory duty of about 6 percent on the lower slab, which would increase it from the present 54 percent to 60 percent.

86–1586. Ali, S.R. **Are Pakistani Cigarette Manufacturers Fighting a Losing Battle?** *Tabak Journal International* 1:12, February 1986.

Pakistani cigarette manufacturing companies are being hurt by subsidiaries of multinational corporations that are moving into the domestic market. The subsidiaries now hold 89.2 percent of the cigarette market, leaving only 10.8 percent for eight Pakistani manufacturers who have 100 percent domestic equity. British American Tobacco has a 66 percent share in the Pakistan Tobacco Co., Philip Morris has a 49 percent share in Premier Tobacco Industries, and Lakson Tobacco recently sold 30 percent of its shares to Rothmans International. Unable to compete against subsidiary access to technological know-how and cost-saving production methods, national companies have appealed to policymakers to provide tariff protection, excise duty allowances, and credit facilities, particularly low-interest financing for purchasing and maintaining tobacco inventory. Government policymakers have been criticized for catering to the needs of multinational giants at the expense of local companies. In addition, the Government (in its commitment to discourage smoking on health grounds) is criticized for not taking note of the amount of foreign exchange being absorbed by subsidiaries each year.

86–1587. Bell, J.W. **France. The Tobacco Crop in 1985: Situation and Prospects.** *Tobacco International* 187(23):22, 24, 26-28, November 1985.

A change in consumer taste is forcing SEITA, the giant French cigarette manufacturer, to switch from production of the traditional strong dark cigarettes to the newer blond cigarettes. The classic Gauloises and Gitanes are being replaced by blond brands such as Royale, News, Pall Mall (under license from American Tobacco Company) and Gauloises Blondes. The market share for blond cigarettes increased from 13 percent in 1976 to 52 percent in the first three quarters of 1985, while the market for dark cigarettes fell from 87 percent to 48 percent in less than 10 years. SEITA (no longer a monopoly) sold 70 billion units in 1979 (79.7 percent of the market) and 56 billion units in 1984 (61 percent share). SEITA's share of the booming blond market, which was 13 percent in 1983, stands at 20.5 percent through the third quarter of 1985. The most popular brand, Gauloises Blondes, has already sold 5 billion units in 9 months of 1985 (10 percent of total blond sales). To survive this market trend, French farmers are diversifying production to include blond varieties. In 1985, 18 percent of total tobacco acreage was planted with Virginia, 12 percent with burley, and the rest with mild dark tobaccos.

86–1588. Bell, J.W. **A New Direction for Spanish Leaf.** *Tobacco International* 188(4):13, February 1986.

When Spain entered the European Economic Community (EEC) in 1986, a new age dawned for tobacco leaf production, which will be reflected in higher quality (and price) of Spanish leaf. The plan, proposed in 1984 and accepted by 94 percent of growers, called for significantly altering production of traditional, fermentable burley between 1985 and 1989. The production of traditional, air-cured burley dropped 11.9 percent in 1984-1985 and 26 percent in 1985-1986, from 37,489 to 24,453 metric tons (t). Virginia production more than doubled over the same period: 57.1 percent in 1984-1985, and 46.8 percent (estimated) in 1985-1986. An increase of 180 percent in processable burley is estimated for 1985-1986, from 2,269 t in 1983-1984 to 6,352 t. Production of other varieties, including Santafe and Havana, are yielding a steady 1,500 t/year. Official estimate of total Spanish leaf production for 1985-1986 is 41,771 t, down 3.2 percent from the more than 43,000 t harvested during 1984-1985. The production changes were needed, although some difficulty is expected as a result of the EEC leaf duty to be imposed on Spanish leaf. This duty will be set to bring Spain's production into harmony with other EEC tobacco crops.

86–1589. Bell, J.W. **A Strong Tabacalera S.A. Enters the European Community.** *Tobacco International* 188(4):5-6, 10, 12, February 1986.

As Tabacalera S.A., the only nationalized industry in Spain to show a 23 percent return on equity, joins the ranks of European Economic Community (EEC) product manufacturers, it is in firm control of more than 90 percent of its domestic markets. The Spanish tobacco monopoly holds a 50 percent interest in Philip Morris Espana S.A. and is in partnership with other major manufacturers. Tabacalera's market strength comes from a factory modernization and quality control program, new emphasis on research and development, and a leaf program designed to give the corporation complete self-sufficiency in tobacco processing and blending. Excluding the Canary Islands, 3,709.95 million packs of cigarettes were sold in Spain in 1984 (56 percent dark cigarettes and 44 percent blond cigarettes). Sales of all tobacco products amounted to 247.7 billion pesetas for the year. In 1985, cigarette sales maintained the same proportions of dark and blond tobaccos as in 1984. The 6.7 percent increase in sales is attributed in part to a successful antismuggling program. An equal value added tax (VAT) on domestic dark and blond cigarettes will be levied after entry into the EEC, and the price gap between the two types of product will be narrowed. Also, Spanish excise taxes will be phased out on imported EEC smoking products. It is anticipated that European manufacturers will gain a foothold in the Spanish market.

86–1590. Bickers, C. **U.S. Flue-Cured Sells Well; Ripest Crop in 10 Years.** *Tobacco International* 187(24):24-26, November 1985.

The 1985 crop of flue-cured tobacco was graded 53.7 percent in ripeness, making it the ripest crop since 1976. A combination of weather conditions (1) placed plants in position to use all available fertilizer; (2) discouraged growers from making additional applications of fertilizer; (3) prevented early harvesting; and (4) encouraged farmers to leave the tobacco in the field in autumn. The percentage graded mature to mellow increased from 47.2 percent in 1984 to 53.5 percent. The ripeness of the crop was also reflected in the relatively low percentage of crop that failed to attract a buyer at a price above the support price and, therefore, went under loans and into inventories at the stabilization cooperative. At 15.3 percent, the loan receipts in 1985 were the lowest since the No Net Cost Amendment went into effect in 1982.

86–1591. Blum, A. **Strategies to Reduce Cigarette Sales. Excise Taxes and Beyond.** *Journal of the American Medical Association* 255(8):1049-1050, February 1986.

Although costs of smoking-induced illness are estimated at from 39 to 55 billion dollars/year, all revenues from cigarette excise and sales taxes (10.1 billion dollars in 1984) were earmarked for deficit reduction, not for health care or for discouraging smoking. Excise taxes are underutilized as a deterrent to smoking, and tobacco companies soften the blow of price increases by (1) introducing value-oriented brands; (2) increasing the number of rebate coupons; (3) increasing point-of-purchase displays; (4) increasing distribution of free sample packs; and (5) increasing tobacco company sponsorship of televised sporting and cultural activities. An increase of only 8 cents/pack in excise taxes on cigarettes might deter hundreds of thousands of adolescents from taking up smoking; however, taxation is not the ultimate answer. Other methods must be employed to curtail smoking, especially among young women, and to prevent the slight decline in cigarette sales among boys from being offset by an increase in smokeless tobacco use. In a national test (between 1967 and 1970) it was shown that counteradvertising had a greater effect in reducing smoking than the more frequently shown cigarette advertisements had in increasing cigarette sales. The major challenge confronting physicians will be to convince legislators to pass far more stringent antismoking measures, including earmarking excise taxes for health promotion.

86–1592. Borchert, T. **Skandinavisk Tobakskompagni Must Restructure Its Range of Cigarettes.** *Tabak Journal International* 1:43-44, February 1986.

A ban on high-tar cigarettes, now the subject of considerable debate in Denmark, might force the Skandinavisk Tobakskompagni (ST) to restructure its line of tobacco products. High-tar tobacco products constitute a major part of ST's 98 percent share of the Danish market. The ban resulted from a 20-year analysis that associated lung cancer with the high tar content in Danish cigarettes. ST's objections to the ban were that a reduction in tar will only increase cigarette consumption, and that smokers pay a high price for Danish cigarettes and expect a high degree of flavor. Although sales of ST's cigarettes declined 1 percent in Denmark, export sales rose 20 percent, primarily to the Federal Republic of Germany. Further increases in exports to West Germany are anticipated for the coming year. Domestic sales of cigars have also decreased and exports increased. Sales of smokeless tobacco dropped by 9.9 percent, but sales of pipe tobacco increased by 1.6 percent. ST's application to Danish authorities for an increase in cigarette prices to offset increased expenditure for raw tobaccos was rejected, and company officials fear the present situation might lead to foreign incursion by such multinationals as Philip Morris and R.J. Reynolds.

86–1593. Bridges, R.G. **Zimbabwe's Flue-Cured Prospects Look Good.** *World Tobacco* 92:36-37, 40, March 1986.

Zimbabwe's flue-cured exports from January to June 1985 were up 13 percent over the same period in 1984, supporting projections that bigger crops are needed to meet demand. Export permits issued in 1984 were 4 percent above those in 1983, and provisional export permit figures for 1985 show a 13.5 percent increase over 1984. The strong demand comes from old and new customers all over the world, rather than from newly found markets. There is a potential for additional exports of 25 million kg/year, but it is unlikely that this level will be reached on a sustained basis for some years to come. It should be appreciated that export levels lag behind crop production by at least 18 months in Zimbabwe, and at present it does not seem likely that the crop size will reach 150 million kg in 1987. By early January 1986, flue-cured growers had planted an estimated 61,000 ha (150,700 acres) compared with 53,375 ha in 1984 and 50,486 ha in 1985. While it is too early to predict final crop size, the flue-cured crop may run more than 130 million kg.

86–1594. Brody, A. **Recovery Against Tobacco Companies. Applying Product Liability Principles.** *Trial* pp. 49-53, November 1985.

Recent court decisions may pave the way for smokers or their estates (and even third parties) to recover against tobacco companies in product liability suits. There has been more willingness to apply developing product liability principles to tobacco products, according to a review of newly developing theories of recovery and an assessment of their prospects for success. The most hopeful cause of action for smokers is failure of tobacco companies to adequately warn of health risks associated with tobacco products, particularly the risk of addiction. Some cigarette companies have deliberately tried to neutralize or negate the effects of required warnings by (1) making warnings inconspicuous or difficult to read, (2) public relations campaigns branding scientific studies linking cigarette smoking with specific harms as controversial, and (3) advertising associating youth, virility, and vitality with cigarette smoking. The law makes special allowances for (1) young people, for their failure or inability to appreciate the consequences of their acts, and (2) smokers, giving recourse to smokers who became addicted to smoking as children. Product liability suits may also offer recovery for third parties (e.g., a nonsmoker who suffers unnecessary injury or death from a fire caused by a smoker's cigarette, or nonsmokers with health problems related to passive smoking in the workplace). Recent decisions in the *Cipollone* v. *Liggett Group, Haight* v. *American Tobacco Co., Kirby* v. *R.J. Reynolds Industries*, and *Roysdon* v. *R.J. Reynolds Industries* are reviewed.

86–1595. Burley, T.M.; Chilvers, L.N. **Trends in Leaf Tobacco Production and Trade: Retrospect and Prospect.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 281-285.

World production of tobacco increased rapidly between the early 1960s and mid-1970s, rising nearly 50 percent, and peaked in 1978 at 5.9 million tons. A leveling-off in demand reduced consumption in developed countries, and slowed the increase in tobacco prices with a subsequent reduction in tobacco plantings (5.2 million tons in 1980). A marked recovery in 1981 returned production to the peak level of 1978. The estimated increase in the 1982 crop to 6.6 million tons is attributable primarily to higher production of flue-cured leaf in China, India, Brazil, Zimbabwe, and Argentina. The bulk of world tobacco production is consumed domestically, with only about one-quarter entering world trade. Expansion in world exports between 1961 and 1980 was predominantly by developing countries, and it is anticipated that developing countries will begin to play increasingly important roles in output, exports, imports, and consumption. Global consumption increased from 3.7 million tons in 1961 to 5.5 million tons in 1975, but leveled off at 5.4 million tons in 1980. Consumption declined in industrialized countries and increased in developing countries. Global output is forecast to reach 6 million tons in 1985, 6.9 million tons by 1990, and 7.9 million tons by 1995. It is predicted that production in developing countries will reach 63 percent of world output in 1985, 65 percent by 1990, and 68 percent by 1995.

86–1596. Chase Econometrics. **The Economic Impact of the Tobacco Industry on the United States Economy in 1983. Volume II. The Impacts on the State Economies.** Bala Cynwyd, Pennsylvania, Chase Econometrics, 1985, 211 pp.

The Chase Econometrics regional system of State-specific econometric forecasting and simulation models were utilized to quantify the economic impact of the tobacco industry in 1983. The State by State analysis is divided into (1) the tobacco core sector's impact on employment and compensation; (2) the supplier sector's impact on each State's employment and compensation; (3) impacts that result from consumption activities of workers (and their families) employed in the tobacco core and all supplier sectors; and (4) impact on various Federal and State and local tax revenues. Nationally, 414,000 persons were employed in production and distribution activities of the tobacco core sector, receiving 6.75 billion dollars in total compensation. The employment and compensation impacts of the supplier sector ranged from the high of 29,117 jobs and 1.0 billion dollars of compensation in New York to a low of 423 jobs and almost 6.0 million dollars in compensation in Vermont. The employment and compensation impacts of expenditure-induced activity ranged from 195,348 jobs and 5.2 billion dollars in New York to 1,536 jobs in North Dakota and 16.6 million dollars in compensation in Wyoming. The largest total of tax receipts, 1.5 billion dollars, was generated in North Carolina. New York, which has a high State excise tax, ranked second; California, with higher cigarette sales but a lower tax rate, ranked third.

86–1597. Misdorp, S. **Hail, Spotty Rainfall Trouble Leaf in Argentina; Cigarette Prices Up.** *Tobacco International* 188(4):20, 22, February 1986.

Varied climatic conditions in Argentina, Brazil, and Paraguay have complicated crop size estimates for 1985-1986. By mid-January, 76 percent of the southern Brazilian Virginia crop was of normal to good quality with the rest severely affected by drought. Brazil's production is estimated at 200,000 tons. In Argentina, where the crop size was estimated at 30,000 tons, farmers received the equivalent of U.S. 2.02 dollars/kilo for Virginia (1.07 dollars paid by the buyer, and 0.95 dollars paid by the Tobacco Fund). At the end of November, the tax on a pack of cigarettes was decreased from 70 to 67 percent to offset a 3.8 percent increase in the price of cigarettes, the first increase granted to cigarette manufacturers since the government placed a freeze on wages and prices on June 15. Although inflation had slowed to an average of 3 percent/month, cigarette prices had lagged 30 percent behind actual cost. In 1985, 1,953 million packs of cigarettes were sold compared with 1,944 million packs in 1984. Nobleza Piccardo and Massalin Particulares, the two main manufacturers, held 58 and 42 percent of the market, respectively. In November 1985, an important international brand (John Player Special by Nobleza Piccardo) was launched and is rapidly gaining an important share of the market.

86–1598. Nettum, G.E. **Wisconsin Leaf Tough Enough for Dry Weather; Total: 15.5 Million Lbs.** *Tobacco International* 187(23):18, 20-21, November 1985.

Despite a dry growing season, tobacco leaf production in Wisconsin is estimated to yield 15.5 million pounds in 1985, matching 1984 leaf production. Production of Type 54 tobacco is usually 1,975 pounds/acre, and Type 55, 1,850 pounds/acre. Price support loan for Wisconsin has been frozen for the last 4 years at 90.7 cents/pound. The loan rate for X-1 grade, the majority of tobacco produced in 1985, is 1.02 dollars/pound. Growers contribute 3 cents/pound for Type 55 and 1 cent/pound for Type 54. Currently, 1.5 million pounds are under loan in the north and 400,000 pounds in the south. The approximately 8,000 acres devoted to tobacco are distributed equally between Types 54 and 55. The 6-year-old surrender and reallocation plan with acreage control requires a farmer to plant 75 percent of his allotment in any 1 of 3 years. Failure to do so decreases the allotment by 20 percent/year. At the end of the fifth year, the entire allotment is taken over. However, if the allotment is surrendered yearly to the county ASCS office, the farmer receives credit as though a crop had been raised. The ASCS office, in turn, reallocates the allotment to another producer within the State who requested additional acreage.

86–1599. Quatraro, A. **EEC Leaf Tobacco Stocks Approaching Zero.** *World Tobacco* 92:67, 71, 73-74, March 1986.

This report (1) explains the functioning of the European Economic Community's (EEC) common market of leaf tobacco; (2) outlines the developments in production and marketing that have taken place under EEC policies and the movements of official prices and their impact on the incomes of producers and on the industry in general; and (3) analyzes (in light of policy changes) the current problems and the development prospects of the EEC's tobacco industry. It is concluded that (1) a balance has been reached between production and marketing resulting from new markets and a growing interest of European manufacturers in EEC-produced tobacco; (2) tobacco growing, in accordance with EEC's new proposals, is a substitute for growing products that are in surplus; (3) increase of tobacco production has less financial impact on EEC than growing speculative products such as wine grapes, fruits, vegetables, milk, and meat in tobacco production regions; (4) more rigorous administration is being imposed with application of current regulations and proposals formulated by the EEC; (5) asscssion of Spain and Portugal should not upset the balance of the market; (6) the EEC remains the most important commercial partner for tobacco-producing third-world countries; and (7) the policy of opening up to the outside world will be continued and encouraged.

86–1600. Rao, P.S. **Despite Inconveniences, Auctions Approved in Andhra, Karnataka.** *Tobacco International* 187(25):5-8, 10, December 1985.

In 1984 to 1985, India exported 74.7 million kg of tobacco (valued at 1,587 million rupees), a decline of 15.2 million kg in volume and 232 million rupees in value from the previous year. The decrease in exports is attributed mostly to decreased purchases by the Soviet Union and the United Kingdom, although exports to Western Europe also declined. Bulgaria bought more, but Italy decreased purchases by an equal amount. Syria showed a significant offtake of 2.9 million kg, and Egypt stepped up purchases, as did Algeria, the Congo, and Somalia. Exports to African countries more than doubled, from 4 million kg in 1983-1984 to 9.7 million kg in 1984-1985. Nepal was the biggest buyer of Indian tobacco in both years. Japan purchased only 300 metric tons (t) compared with 748 t in the previous year, and exports to the United States also showed a rapid decline (from 177 t in 1983-1984 to 32 t in 1984-1985). As a consequence, India's Tobacco Board decided to reduce the size of the 1986 crop. Farmers were more than satified with the auction system of marketing (several of which are described in detail), despite inconveniences inevitable in the first year of such large scale operations.

86–1601. Ridgway, L. **Taxes Drive Zimbabweans to "Newsprint Cigarettes."** *World Tobacco* 92:45, 52, March 1986.

Three years of tax increases reduced cigarette consumption in Zimbabwe from 3,048.4 million in 1982 to 2,280 million in 1984. An increase in the use of hand-rolled cigarettes (newsprint and raw cured-leaf) is masking the extent of any current increase. Estimated losses to the homemade cigarettes are more than 100 million pieces annually, and possibly several times higher, according to investigations by Zimbabwe's two tobacco manufacturers (BAT and Rothmans) that market Kingsgate, Berkeley, Madison, and Everest brands. Homemade cigarettes require relatively little tobacco. Bits of leaf dropped from bales in packing plants can provide the source; however, it is suspected that most is pilfered from barns. Stricter security and destruction of unwanted tobacco have been ordered to reduce black marketeering. Pilfering is difficult to police, and measures to curb the practice cannot be easily enforced.

86–1602. Shelton, A. **Economic Downswing Creates Rough Times.** *Tobacco Reporter* 113(2):24-26, 28, February 1986.

The downward swing of world economic conditions has caused leaf production in Thailand to decline steadily. Leaf supplies have exceeded demand in many major world markets, and reduced buying power at home has decreased cigarette sales. Tobacco production in 1985 declined 6.6 percent, primarily in flue-cured and burley. Production of burley will continue to decrease in the future unless purchases by Thailand's two biggest customers, e.g., China and Indonesia, return to former levels. Roughly 60 percent of flue-cured production is traditionally grown for export. Burley shipments increased by 27 percent in 1984, mainly as a result of higher shipments to Egypt, the Netherlands, and the United States (Thailand's largest burley customer), which bought 45 percent of total production. Sales to the United Kingdom and West

Germany declined, and none were made to the Philippines. It is estimated that burley sales to foreign buyers will remain the same in 1985. Cigarette consumption in Thailand is estimated at 100 to 110 million pieces/day. The Thailand Tobacco Monopoly produces 85 million pieces/day.

86–1603. Shelton, A. **The Quest for Better Quality.** *Tobacco Reporter* 113(3):26-29, March 1986.

The China National Tobacco Corporation, which sets policy and directs all purchases, production, marketing, finances, agriculture, and trade, is trying to improve product quality through modernization by establishing joint ventures and bilateral trade relations based on mutual benefit: those who are willing to transfer technology to China at favorable terms will be given priority in order placing. More than 200 million dollars of foreign exchange has been set aside for importing new equipment and materials. Chinese farmers planted 733,333 hectares of flue-cured tobacco in 1984 and harvested nearly 1.5 million metric tons of leaf. Farmers who produce higher quality crops are rewarded with higher prices. In addition, a levy of 40 percent of the price received by the farmer assures local governments more revenue from quality tobacco. In 1985, counties collected 450 million dollars in tobacco taxes in addition to that derived from cigarette taxes. Approximately 330 million people (93 percent men) smoke in China, an increase of 130 million since 1979 (when an antismoking campaign went into effect), which is attributed to salesmen and retailers in 300,000 retail centers, since no tobacco advertising is permitted in China. More than 3,000 different brands of Chinese cigarettes are produced by 146 tobacco companies. Cigarette production, which had increased rapidly over the past few years, is expected to slow to about 5 percent/year.

86–1604. Tabak Journal International. **US Tobacco Farmer Faces Tough Competition.** *Tabak Journal International* 1:10-11, February 1986.

Competition from increased foreign leaf quality, the value of the dollar in relation to foreign currencies, and changing production trends are creating difficulties for the American farmer. However, the tobacco industry continued its customary trade surplus in the third quarter of 1985: exports were valued at 1,697 million dollars and imports at 1,037 million dollars. American-grown tobacco faces stiff competition because high support prices and a strong dollar have forced exports to decline and imports to rise. The proportion of domestic leaf in American cigarettes is not likely to increase as long as the tobacco program maintains relatively high prices, especially in relation to less expensive imported tobaccos. According to the U.S. Department of Agriculture, a drop of 30 to 50 cents/pound in cigarette leaf prices, which would result in only a 1- or 2-cent decrease in the retail price of a pack of cigarettes, would make the United States competitive again. Despite growing cigarette consumption, domestic use of American tobacco declined about 25 percent from the early 1950s to the mid-1980s as a result of the switch to filtered cigarettes, use of puffed tobacco and sheet tobacco and stems, and reduced cigarette circumference.

86–1605. Tobacco International. **Tobacco Tonnage Declines at N.C. Ports, But Imports Rise.** *Tobacco International* 188(3):20, 22, February 1986.

Prices, the strength of the American dollar, and quality of product are contributing to the decline in tobacco exports from the United States. Buyers from Europe and Japan, the largest importers, have reduced purchases over the last several years, relying on other markets to fill leaf requirements. Total tobacco at North Carolina ports was down by 10,000 tons in 1985, although there was a 50 percent increase in imports. The ports handled 138,647 tons of tobacco leaf in 1985 (55,891 tons imports and 87,756 tons exports) compared with 148,924 tons in 1984 (28,715 imports and 120,209 exports). Leaf movements at the Port of Wilmington, which totaled 90,251 tons in 1985 compared with 119,000 tons in 1984, reflected an increase in import leaf to be used in special cigar and pipe tobacco blends (over 28,000 tons in 1985 compared with 16,000 tons in 1984). Exports at Wilmington totaled 61,000 tons in 1985 compared with 103,000 tons in 1984. The port at Morehead City handled 27,354 tons of imports and 21,040 tons of exports in 1985, an increase of more than 19,000 tons over 1984.

86–1606. Umur, H. **Quantity, Quality of '85 Aegean Crop Similar to '84s; TL800 per MT.** *Tobacco International* 188(2):5-6, January 1986.

Turkey's total tobacco production of 191,464 tons in 1984 fell below that of the 1983 crop by 18 percent. The Aegean region alone produced 107,000 tons, with 75,000 tons bought by exporters, and 32,000 tons by the Monopoly. Average exporter purchasing price was 966.34 Turkish liras, 82 percent higher than that of the previous year. The high total cost for the crop paid by exporters was augmented by a weak dollar (all Turkish tobacco exports are priced and paid for in dollars) and by high interest rates on foreign currency, cutting deeply into anticipated revenues. Black Sea and Marmara region production, unchanged from the previous year, amounted to 39,000 and 9,300 tons, respectively. Aegean production for 1985 (estimated at 115,000 tons) will probably fall short by about 5,000 to 10,000 tons. Exporters have already purchased 80,000 tons of the new crop. Cigarette sales were dominated by the 17 brands of Tekel cigarettes (manufactured by Turkish State Monopolies), with 94.5 percent of the market. Marlboro 100s held second place with 3.6 percent. The cost of imported cigarettes is high, TL570 to TL600/pack, while Tokat, the most expensive Monopoly brand, sells for TL230/pack.

86–1607. Von Planner, R. **Cigarettes: Foreign Brands on the Rise; MS Has Peaked.** *Tobacco International* 187(24):14, 16, November 1985.

In 1984, tobacco revenues in Italy amounted to 7,690 billion lire, an increase of 12.4 percent over 1983, but imports gained a stronger foothold in the domestic market. Although total sales amounted to 105,960 metric tons (t) compared with 103,930 t in 1983, Italian brands registered a slight decline. However, the Monopoly's MS brand, with 44 billion cigarettes sold, retained 65.5 percent of all Italian brands and 42.1 percent of the total cigarette market. Marlboro, the undisputed leader of foreign brands (13 billion cigarettes), improved its market share from 11.1 percent in 1983 to 12.3 percent in 1984. Other foreign brands were Merit, Multi-filter, Muratti Ambassador, Diana, and Camel. The sales trend continued into 1985: Italian brands continued to decline, while foreign brands showed an increase of 8.4 percent. A 10 percent increase in the price of cigarettes in October raised the cost of Italian cigarettes by 100 lire/pack and foreign cigarettes by 200 lire/pack.

86–1608. Von Planner, R. **1985 Crop Larger Than 1984's But of Problematical Quality.** *Tobacco International* 187(24):7-10, 12, November 1985.

Considerable quantities of bright, burley, and Kentucky tobaccos from 1984 are still unsold in Italy, a difficult situation that is being compounded by the 1985 crop. Worldwide, demand for tobacco is decreasing because of (1) increased leaf production in nearly all tobacco-producing countries including some with lower labor costs than in Europe; (2) reduced or stagnant cigarette consumption in many parts of the world owing to health awareness; (3) heavy price increases; (4) high production costs; and (5) taxation. The high cost of money also made Italian leaf less competitive in the world market. Tabular data include (1) final results of the 1984 crop by varieties and green tons and estimates for the 1985 crop in green tons; (2) prices and premiums for the 1985 crop as established by the European community, including objective and intervention prices for green tobacco and packed intervention prices and premiums (1985 prices are very similar to those of 1984); and (3) export data for the 1984 crop (which are incomplete).

86–1609. World Tobacco. **South African Growers Seek Larger Quotas.** *World Tobacco* 92:53-54, March 1986.

The increase in domestic cigarette consumption and increasing isolation from international trade is bolstering requests from South African farmers to grow more tobacco. Last year, a tobacco cooperative advised its growers to produce an extra 2 million kg of flue-cured tobacco (not covered by the Tobacco Board's agreement with manufacturers) that was subsequently offered for export. It is anticipated that despite political considerations, South African tobacco will easily find export markets, since it is cheap in terms of U.S. dollars. The 1983-1984 average price was equivalent to 209.2 U.S. dollars/kg for flue-cured and 179.2 U.S. dollars/kg for burley. Cigarette manufacturers are seeking larger import quotas to make better quality products. Insufficient rainfall has produced tobacco with an undesirably high nicotine content, causing problems for manufacturers who are trying to produce a low-tar and low-nicotine cigarette for the domestic market. Production estimates for the 1985-1986 crop (compared with 1984-1985 figures) are 28.22 million kg flue-cured (24.41 million kg); 8.01 million kg air-cured (7.77 million kg); 2.66 million kg burley (2.62 million kg); and 1.15 million kg oriental (1.06 million kg).

See also **86–1562, 86–1566**

LEGISLATION

86–1610. Blalock, T.C. **U.S. Tobacco Reform Legislation Moves One Step Closer.** *Tobacco International* 188(2):20, January 1986.

Tobacco reform legislation scheduled for passage in early February would (1) set the 1986 price supports for flue-cured at 143.80 dollars/hundredweight and for burley at 148.80 dollars/hundredweight; (2) base future price supports on long trend changes in the market average (two-third weight) and changes in an index of prices paid by tobacco farmers (one-third weight); (3) set a reserve level (amount under loan) of 200 million pounds of flue-cured and 50 million pounds of burley or 15 percent of the quota, whichever is greater; (4) set the quota on the amount of tobacco domestic cigarette manufacturers intend to purchase and a 3-year average of exports, and between 97 and 103 percent of the projected reserve amount with no more than 6 percent for each of the 4 years and 10 percent for the following 4 years; (5) penalize manufacturers who fail to purchase at least 90 percent of the intended purchase; (6) share future assessments equally between growers and purchasers, with assessments to growers not to exceed 2 to 3 cents for 1986 under this legislation; and (7) permit the cigarette manufacturers to purchase the entire inventory of flue-cured and burley tobacco from 1976-1984 crop years, since growers have no responsibility for these stocks.

86–1611. Davis, R.M. **Legislative Action at the State and Local Level to Reduce Tobacco Consumption.** *State Health Legislation Report* 14(1):1-15, February 1986.

Various legislative approaches are available to curb the use of tobacco. Clean indoor air acts have the greatest long-term effect on discouraging use, but persistent, effective action is necessary for adoption. Proposals to increase State and local cigarette taxes are attractive for their revenue-generating potential. Although little used, health insurance coverage for smoking cessation programs and financial incentives for nonsmokers are potentially effective tools to reduce cigarette consumption. Strategies to pursue legislative remedies depend on local factors. Introducing a package of bills is one approach based on the idea that at least one of the proposals might be adopted as part of a compromise. Alternatively, a medical society might introduce and devote all of its resources toward a single tobacco control bill. Widespread legislative activity in courts and municipalities may favor adoption by diluting resources available to the tobacco industry and its allies to fight a particular type of legislation. Building coalitions with other interested groups is essential. As part of the effort, organized medicine must commit itself to a relentless campaign of antismoking education and legislation. State and county medical societies have the opportunity and obligation to join the effort to achieve a tobacco-free society by the year 2000. Samples are provided for (1) an act to regulate the smoking of tobacco products in public places and at public meetings; (2) an ordinance to prohibit the distribution of free cigarette samples on public property; (3) an act to prohibit the sale or distribution of tobacco and tobacco products to individuals under 18 years of age; and (4) an act to provide for the establishment of a comprehensive health education program in the elementary and secondary schools. (Auth. Abs. Mod.)

86–1612. Haglund, M. **Experience of Legislation—The Swedish Experience.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 299-303.

Nine out of ten Swedes 18 to 70 years of age are in favor of nonsmoking rules established by the Government requiring health warning labeling, declaring tar/nicotine content, controlling tobacco sales and advertising, and restricting smoking in public places. Sweden's tobacco labeling system is unique in that 16 direct, but simple health warnings are rotated on tobacco products (e.g., smoking in a car can cause fellow passengers impairment of the respiratory passages and eye irritation; children may be particularly susceptible). A strong partial ban on advertising controls "obtrusive or aggressive" messages and bans direct mail and outdoor billboard advertising and restricts promotion such as prize contests. However, newspaper and magazine advertising is permitted, but not in publications directed at young people under 20. A total ban has been recommended by critics and the tobacco committee of the Swedish Ministry of Health and Social Affairs is considering stronger legislation, including recommendations against smoking in public and in work places. The number of daily smokers has been reduced significantly from 50 percent in 1963 to 30 percent in 1982. Among women, the number has decreased from 34 percent in 1976 to 30 percent in 1982. A similar trend is reported for adolescents.

86–1613. Hanauer, P.; Barr, G.; Glantz, S. **Legislative Approaches to a Smoke Free Society.** Berkeley, California, American Nonsmokers' Rights Foundation, 1986, 149 pp.

The report by the American Nonsmokers' Rights Foundation on the legislative approaches to a smoke-free society is organized into two parts: (1) a narrative that describes the issues and how to go about passing a law, and (2) appendices that contain documents of a technical nature and samples of other useful materials. This narrative volume includes (1) a short history of the nonsmokers' rights movement, (2) the health hazards of second-hand smoke, (3) supporters and opponents of nonsmokers' rights legislation, (4) the issues, (5) scope and types of legislation, (6) experience with existing legislation (what the record shows), (7) the basics of organizing, (8) legislative strategy, and (9) dealing with the media. These comprehensive volumes were prepared so that anyone making a serious attempt to pass legislation would have readily available all the relevant information that could be assembled, based on many years of experience in the field. It is suggested that the volumes be treated as resource materials that can be constantly referred to and not as something to be read through once and put aside.

86–1614. Hanauer, P.; Barr, G.; Glantz, S. **Legislative Approaches to a Smoke Free Society. Appendix.** Berkeley, California, American Nonsmokers' Rights Foundation, 1986, 783 pp.

This second volume (appendices) on legislative approaches to a smoke-free society includes (1) the 1978 Roper report prepared for the Tobacco Institute; (2) Proposition P: Anatomy of a Nonsmokers' Rights Ordinance; (3) charts of California and national nonsmokers' rights laws; (4) bibliography on involuntary smoking; (5) testimony in support of nonsmokers' rights legislation; (6) indoor air pollution studies; (7) data on smoking and fires; (8) cost of smoking to business; (9) public opinion surveys on smoking restrictions; (10) editorials and cartoons about smoking; (11) correspondence showing misuse of medical evidence by opponents of nonsmokers' rights legislation; (12) Tobacco Institute analyses of health effects of passive smoking and rebuttals thereto; (13) tobacco industry polls on smoking restrictions and related newspaper articles; (14) legal opinions on legislation; (15) newspaper articles on success of nonsmokers' rights laws; (16) transcript of a debate between a nonsmokers' rights activist and a tobacco industry representative; (17) model smoking pollution control ordinance and samples of California control ordinances; and (18) sample press releases, letters, brochures, petitions, and endorsements of enforcement officials. These comprehensive volumes were prepared so that anyone making a serious attempt to pass legislation would have readily available all the relevant information that could be assembled, based on many years of experience in the field. It is suggested that this volume be treated as a resource that can be constantly referred to and not as something to be read through once and put aside.

86–1615. Hauknes, A. **Main Points in the Twenty Year History of Political Initiatives and Legislation Concerning Tobacco in Norway.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 305-308.

A balanced strategy to combat smoking in Norway, consisting of information and education, legislation, and cessation activities, is beginning to show results for men: the number of daily smokers has decreased from 51 to 40 percent. Although the number of women who smoke still fluctuates around 32 percent, the number of smokers among adolescent girls in 1979 was slightly below that of boys (20.5 percent vs. 22 percent), a decline from 1975 (28 percent vs. 23.5 percent, respectively). Per capita consumption of cigarettes and hand-rolled tobacco in Norway for the last 25 to 30 years showed a distinct change around 1970, about the time that political discussions of smoking countermeasures were begun and when the total ban on tobacco advertising was imposed. The Tobacco Act of 1973, in addition to the advertising ban, required health warnings on cigarette and tobacco packs, and prohibited sales of tobacco to persons under 16 years of age. More recent legislation provides additional antismoking support: (1) the single health warning required in 1973 for cigarette packages will be expanded in 1984 to 12 warnings that will be rotated; (2) in 1981 and 1982 the price of cigarettes (65 percent of which is State duties and taxes) was increased by more than 30 percent; and (3) the Working Environment Act, passed in June 1981, restricts workplace smoking. Any changes in smoking habits and attitudes toward smoking cannot be achieved by legislation alone, but it is an important part of a total program.

86–1616. Kahn, P.L. **The Minnesota Clean Indoor Air Act: Legislation Enacted With Volunteer Group Support.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 309-311.

The Minnesota Clean Indoor Air Act of 1975 owes its passage to the persistence and devotion of the Association for Non-Smokers' Rights (ANSR) and support from the American Lung Association, American Cancer Society, and other groups. The law, which is basically reasonable, does not prevent anyone from smoking, but requires that areas be set aside in restaurants, meeting rooms, and the workplace for nonsmokers or the entire area be declared a no smoking area. Unlike some other State laws, the Minnesota law forbids smoking anywhere unless it is specifically allowed, thus making smoking socially and legally unacceptable. Costs of implementation and enforcement amount to 4.6 thousand dollars/year, primarily for establishing and modifying existing rules, erecting signs, and answering complaints. Although penalties are part of the law, few formal summonses have been issued: the law appears to be self-enforcing. Polls indicate a 92 percent of nonsmokers and 87 percent of heavy smokers (<41 cigarettes/day) support the law. An addendum, the Omnibus Nonsmoking and Disease Prevention Act, is designed to promote nonsmoking (1) in the schools with education programs, (2) at the worksite by providing assistance to employers in complying with the clean air law, (3) in the community by providing grants to local health departments for smoking prevention programs and by providing a public information program.

86–1617. Lundberg, G.D.; Knoll, E. **Tobacco: For Consenting Adults in Private Only.** *Journal of the American Medical Association* 255(8):1051-1053, February 1986.

To end tobacco abuse, the American Medical Association is seeking legislation to (1) end the Federal tobacco price support program; (2) rotate health warning labels on packs of cigarettes, snuff, and chewing tobacco; (3) increase the cigarette tax to 32 cents/pack; and (4) prohibit smoking in public places. In the past, the AMA has encouraged insurance premium discounts for nonsmokers, health education programs targeted at 8- to 18-year-olds, legislation prohibiting cigarette vending machines, and physician activism against tobacco. The strongest step taken was support for a ban on all advertising of tobacco products in magazine and newspapers and on billboards and a resolution to initiate and support antiadvertising legislation. Current considerations include (1) prohibiting the growing, manufacturing, selling, possessing, and use of tobacco and tobacco products; (2) preventing the tobacco industry from addicting the young; and (3) regulating, restricting, and banning tobacco by Federal legislation and Federal agencies. In addition, decisions of the Food and Drug Administration, the Consumer Products Safety Commission, and the Environmental Protection Agency that allow tobacco to be excluded as a drug, to be exempted as an unsafe product, and to be excluded as a toxic substance and an air pollutant should be challenged.

86–1618. Salem, A.; Salem, E-S. **Tobacco Advertising and the Counterattack in Egypt.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 381-382.

In Egypt, legislation passed in 1981 requires health warnings and tar/nicotine content labeling on cigarette packs and bans tobacco advertising from television and radio and from prominent sites. However, the tobacco industry has countered by sponsoring important athletic events and distributing promotional materials (shirts) and by having sports heros endorse tobacco products. Advertising, which is still permitted in the press, has spilled over into public transportation and to areas near mosques and tourist attractions. Queen Cleopatra, Queen Nefertiti, and other historical figures have been employed to promote tobacco products, and even sky-writing has been employed. Consequently, cigarette production is still increasing. This continued increase in production and in tobacco imports is attributed to advertising. Antismoking legislation has initiated voluntary efforts (e.g., the Rotary group has published an antismoking series and railway companies have set aside no-smoking areas), but the battle against tobacco in Egypt requires still more attention.

86–1619. Shelton, A. **Product Liability Cases in the U.S.—What's at Stake?** *Tobacco Reporter* 113(3):40, 42, 44, March 1986.

In suits against tobacco companies, a new product liability law is giving attorneys for the plaintiffs more confidence. Previously, product liability cases were defended on the principle of assumed risk, arguing that smokers voluntarily exposed themselves to disease risk by choosing to use a product widely associated with health problems. Current suits employ a theory of liability designed to circumvent the awareness of risks defense, i.e., warning labels do not warn against addiction and are negated by advertising that associates smoking with vigor and pleasure. The doctrine of contributory negligence is being replaced by one of comparative negligence, under which a company can be ordered to pay damages in proportion to its responsibility. In New Jersey (where eight tobacco lawsuits are pending), (1) producers of a product have a legal duty to warn users of all dangers associated with the product even if the dangers have not been absolutely proved; (2) a product must be declared defective if risks outweigh benefits; (3) comparative negligence has replaced contributory negligence; and (4) defense of voluntarily assumed risk must show that the consumer knew and understood the magnitude of all risks involved. Recent court rulings have been conflicting: in 1984, the U.S. District Court, New Jersey, ruled that cigarette companies can be held liable for smoking-related injuries despite health warnings, but in the U.S. District Court, Tennessee, in 1985 it could not be argued that a company's cigarettes carried inadequate health warnings. Such conflicts might have to be resolved by the U.S. Supreme Court.

86–1620. U.S. House of Representatives, 99th Congress, First Session. **Comprehensive Smoking Education Act.** Hearings Before the Subcommittee on Health and the Environment, Committee on Energy and Commerce, June 24, 1985, Serial No. 99-41, 1985, 60 pp.

Implementation of the Comprehensive Smoking Education Act (H.R. 2835), under which current health warnings will be replaced with four more specific warnings (to be rotated on cigarette packages and advertising every 3 months beginning October 12, 1985) is discussed. The Interagency Committee on Smoking and Health (established under a provision of the act), now being formed under the auspices of the Office on Smoking and Health (DHHS), will consist of representatives from the private sector, other Federal agencies, and agencies of the Public Health Service. The statement by Donald R. Shopland, Acting Director, includes reports on the many other activities of the Office on Smoking and Health that will be reinforced under the new act. The office had also established a working group of Public Health Service scientists who will develop a protocol to evaluate the possible health effects of the ingredients added to tobacco, which will be possible under the act's provision requiring annual disclosure by tobacco companies of all chemical ingredients used in manufacturing cigarettes. The problems encountered by the Federal Trade Commission in trying to implement the labeling requirements are reviewed, and a bill that would provide some alternatives to the rotation requirements is included. Testimony from the Coalition on Smoking or Health (founded by the American Heart Association, American Lung Association, and American Cancer Society), which was instrumental in getting the new law enacted, is also presented. Also discussed were concerns raised by a number of small cigarette manufacturers and importers about their financial and technical ability to comply with the new requirements on health warnings.

86–1621. Warner, K.E. **Smoking and Health Implications of a Change in the Federal Cigarette Excise Tax.** *Journal of the American Medical Association* 255(8):1028-1032, February 1986.

The Federal cigarette excise tax can be a powerful tool of public health policy in that any changes can ultimately influence the health of smokers and potential smokers. It is estimated that an 8-cent decrease would induce up to 1 million young people (aged 12 to 25 years) to start smoking, and hundreds of thousands of Americans over 25 years of age would also start or continue smoking. Conversely, an 8- to 16-cent increase would encourage from 1 to 2 million young people and 800,000 to 1.5 million adults to quit smoking or not to start. A tax increase could prevent hundreds of thousands of premature smoking-related deaths, while a tax decrease would contribute to the burden of tobacco-related disease. The toll of smoking is linked to the smoking practices of the youngest generation. There is a widespread consensus that the conquest of smoking-induced illness can come only from preventing the onset of smoking in the adolescent and early adult years, and adolescents can be driven toward or away from smoking by the Federal cigarette excise tax. (Auth. Abs. Mod.)

86–1622. Weigum, J. **The Self-Enforcing Law; The Way to a Cleaner Indoor Environment.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnepeg, Canada, 1983,* Volume 2. Ontario, Canadian Council on Smoking and Health, 1983, pp. 333-336.

The success of the Minnesota Clean Indoor Air Act (MCIAA), passed in 1975, is attributed to cooperation between the Association for Non-Smokers' Rights (ANSR) and the State's Department of Health. MCIAA has earned the approval of 87 percent of smokers and nonsmokers. The underlying philosophy of MCIAA is that the right to breathe smoke-free air takes precedence over the privilege of smoking. The law states that any place not posted as a smoking area is a no smoking area. Places of employment, hospitals, grocery stores, nursing homes, movie theaters, bowling alleys, retail establishments, barber shops, and similar enterprises must be entirely smoke-free or must have smoking areas that do not encroach on the rights of nonsmokers. Enforcement of the law is the responsibility of the proprietor at each establishment, although the health department is the ultimate enforcer. Some problems that emerged in restaurants and the workplace after passage of the law are discussed.

86–1623. Weigum, J. **Passage of the First Comprehensive, State-Wide, Smoking Control Law in the U.S.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 327-331.

Since passage of the Minnesota Clean Indoor Air Act (MCIAA) in 1975 (the first comprehensive statewide smoking control law in the United States) 59 percent of employers have provided nonsmoking areas in production facilities. In addition, 53 percent provide nonsmoking areas in company cafeterias, 45 percent have separate smoke-free environments for nonsmokers, 32 percent prohibit smoking in all production facilities, and 7 percent prohibit smoking in all cafeterias. All but a few restaurants have a no smoking section; at least 30 percent is set aside for nonsmokers in most restaurants. Most patrons are asked about their preference before seating. Average daily consumption of cigarettes is also lower than the national average. In 1978, 73 percent of all adults and 71 percent of smokers thought that the MCIAA should be strictly enforced. In 1980, 92 percent favored the MCIAA (94 percent of light smokers and 87 percent of heavy smokers, ≥40 cigarettes/day), and 95 percent (92 percent smokers and 97 percent nonsmokers) believed smoking is a health hazard. Also discussed is the Association for Non-Smokers Rights, which was instrumental in getting the legislation passed and now makes and sells no smoking signs and provides relevant literature about the law and the effect of the law on the perception of smoking in Minnesota.

See also **86–1556, 86–1559, 86–1563, 86–1631**

GENERAL

86–1624. American Thoracic Society. **Cigarette Smoking and Health.** *American Review of Respiratory Disease* 132(5):1133-1136, November 1985.

This official statement by the American Thoracic Society (ATS) addresses the adverse health effects of cigarette smoking, the addictive nature of the habit, and aspects of smoking cessation and prevention. Emphasis is placed on information accumulated since the 1964 Surgeon General's Report. The ATS reaffirms that cigarette smoking is the major preventable cause of increased mortality and premature disability in the United States and a proven cause of coronary heart disease, chronic bronchitis, emphysema, and lung and other cancers. Maternal smoking is associated with low infant birth weight, increased perinatal mortality, and several complications of pregnancy. Passive smoking is associated with increased incidence of lower respiratory tract infections in very young children and may increase the risk of lung cancer in nonsmokers. Smoking cessation is difficult because of nicotine addiction and psychological and social factors. Physicians and other health professions must be active both in helping people quit smoking and preventing nonsmokers from starting. It is recommended that a national effort be focused on preventing young people from starting to smoke.

86–1625. Arkinstall, W.W. **Smoking: The Social Issue. (Letter).** *Canadian Medical Association Journal* 134(1):13-14, January 1986.

Smokers have become a harassed and embarrassed minority, and many advocates for a smokeless society have indeed focused on the smoke rather than on the smoker's habit. An earlier writer (*Canadian Medical Association Journal* 133:798-799, 1985) correctly pointed out that smoking is a health risk to both the smoker and the recipient of secondhand smoke, but the most important point was overlooked: smoking is a social issue. During World War II and the years immediately after the war, smoking was actively promoted by the tobacco industry and by most aspects of society; movie heros and heroines in the 1950s and 1960s almost always smoked cigarettes. Today, although a smoker is seldom seen on a movie or television screen, society promotes the social acceptability of smoking in more subtle ways. Ashtrays on every table in restaurants convey the message that the management expects and invites patrons to smoke. The smoking habit can be controlled by education and appropriate measures of social pressure. Smokers have to be made aware of places where it is inappropriate to smoke, and the health issue can be effective reinforcement. Social pressure has been used before to modify behavior; the fashionable spittoon, ever present in lounges and dining rooms of most fashionable hotels not so many years ago, was removed by appropriate social pressure. (Auth. Abs. Mod.)

86–1626. Bailey, B.J. **Tobaccoism is the Disease—Cancer is the Sequela. (Letter).** *Journal of the American Medical Association* 255(14):1923, April 1986.

Tobaccoism, the most deadly drug addiction in the United States today, is exacting a heavier toll in lives and dollars than cocaine, heroin, acquired immunodeficiency syndrome, traffic accidents, murder, and terrorist attacks combined. Citizens are losing their lives to tobaccoism at the rate of 1,000/day. To combat tobaccoism, it is recommended that (1) Federal and State taxation of all tobacco products be increased significantly to equal the costs to society; (2) a major portion of tobacco tax revenues be earmarked for research dealing with prevention and treatment of chronic tobaccoism and its sequelae of cancer, emphysema, and cardiovascular disease; (3) Federal subsidization of tobacco growing be reduced significantly; (4) an effective national antismoking campaign be launched and targeted at women and young adults; (5) warning labels be placed on all tobacco products; (6) tobacco advertising be removed from public media; (7) celebrities and moviemakers be discouraged from glamorizing tobacco use; and (8) sale of tobacco be restricted to individuals over 18 years of age.

86–1627. Bulka, R.P. **Smoking: A Jewish View.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 371-375.

Smoking is a form of self-destruction, yet 59 million Americans and millions of people around the world continue to smoke. Smoking is discussed from the Judaic point of view in terms of self-preservation and social responsibility. Suicide is forbidden under Jewish law. Some religious leaders feel that cigarette smoking falls into the forbidden category, while others are reluctant to prohibit an activity practiced by a large portion of the population. Judeo-legal pronouncements have been unanimous in discouraging smoking, but not in legally prohibiting the practice. Passive smoking has become an important issue, particularly the effect on the health of nonsmokers, especially children. The effects of maternal smoking on the unborn accentuates the harm that smokers inflict upon nonsmokers. Jewish law, rigidly opposed to self-destruction, is equally opposed to harming others. There is even an ancient precedent for prohibiting the pollution of air in the Tofsefta assertion to locate furnaces at least 50 amot (approximately 75 feet) from the city because pollutants emitted by the furnace were considered harmful.

86–1628. Council for Tobacco Research—U.S.A., Inc. **1984 Report of the Council for Tobacco Research—U.S.A., Inc.** New York, Council for Tobacco Research—U.S.A., Inc., 1984, 149 pp.

The 1984 report of the Council for Tobacco Research—U.S.A., Inc., includes (1) detailed findings of a 9-year study in which mice were exposed to cigarette smoking inhalation; (2) abstracts of Council-supported research in cancer (37), respiratory system (39), heart and circulation (33), neuropharmacology and physiology (6), pharmacology and biochemistry (18), immunology and adaptive mechanisms (33), metabolism (5), and epidemiology (3); (3) listing of active projects by principal investigator or institution, with respective project titles; and (4) listing of projects completed prior to 1984 by principal investigator or institution. Data from the smoke inhalation study showed that none of the smoke-exposed animals developed pulmonary squamous cell carcinoma; mice pretreated with a pure carcinogen did not have significantly increased lung cancer after prolonged smoke exposure; and the overall numbers of pulmonary neoplasms identified were not significantly different in smoke-exposed mice compared with sham-exposed or control mice. The 174 abstracts presented raise the total of scientific papers acknowledging Council support to 2,525. By the end of 1984, the Council's program had provided more than 91.5 million dollars to 526 investigators. (Council reports published annually before 1971 are attributed to C.C. Little.)

86–1629. Delarue, N.C. **Smoking or Health Activities: Lessons From the Past, Implications of Present Experience, Challenges for the Future.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 797-806.

Smoking among women, cigarette tar and nicotine levels, nonsmokers' rights, passive smoking, worldwide information, and research activities are recommended as topics for the next world conference on smoking and health. Although the campaign against cigarette smoking has achieved some success, 50 percent of Americans are still unaware of many related risks, 20 percent do not know about the risk of lung cancer, and 30 percent are not aware of the risk of heart disease, according to a 1981 U.S. Federal Trade Commission report. It is recommended that (1) women's health group activities be increased with investigative networks in each hemisphere to evaluate the effectiveness of programs for women; (2) research efforts on the role of tar and nicotine in cigarettes be increased to assess harmful effects; (3) nonsmokers' rights be given appropriate weight in planning the next conference program; (4) routine data (i.e., consumption and vital statistics) be made available for as many countries as possible; (5) research into passive smoking and its effects on health be increased; and (6) Third World research on harmful consequences of smoking be supported.

86–1630. Elder, M.J. **"Smokeless Society by 2000" Debated. (Letter).** *Archives of Internal Medicine* 146(1):208, January 1986.

In projecting a smokeless society by the year 2000 (*Archives of Internal Medicine* 145:1581, September 1985), Dr. C. Everett Koop failed to include dealing with parents of 13-year-olds, the most common age of smoking initiation. In less than 15 years, these adolescents may be smoking 20 to 40 cigarettes/day. As for the need to quit smoking, the toughest person to convince is the patient who has just received a diagnosis of obstructive lung disease. Persons other than physicians need to be involved; in fact, a worldwide concentrated effort is necessary. However, 2075 should be the year of attainment, not 2000.

86–1631. Karunaratne, W.A. **Legislation and Political Activity in Sri Lanka in the Field of Smoking and Health.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983*, Volume 1. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 555-559.

Cigarette consumption in Sri Lanka increased 42 percent from 1969 to 1972, and has been increasing at a rate of 9 percent annually since that time. Approximately 5 million kg tobacco are produced each year: 250,000 kg for export and the rest for internal consumption as 5,000 million cigarettes and 15 million bidi. Surveys have indicated that (1) smoking decreased among doctors by nearly 14 percent between 1972 and 1982; (2) 12 percent of school children smoke regularly and 16 percent occasionally; and (3) 21.8 percent of 19-year-old, 16.3 percent of 18-year-old, and 16.7 percent of 20-year-old students are smokers. Tar and nicotine content of Sri Lankan cigarettes is higher than that allowed in more developed countries. The Consumers Protection Act restricts tobacco advertisements on radio and television and also requires health warnings in three languages on all packs of cigarettes and in cigarette advertising. Smoking is prohibited in public places. New legislation will expand control of tobacco advertising in the mass media and require tobacco companies to publish tar and nicotine content of cigarettes. A National Committee on Tobacco and Health has been established to provide information and to conduct research.

86–1632. Koop, C.E. **The Quest for a Smoke-Free Young America by the Year 2000.** *Journal of School Health* 56(1):8-9, January 1986.

At the beginning of the 20th century 18 billion cigarettes were sold each year, and as recently as 50 years ago only about 4,000 persons were dying of cancer. Today, the 600 billion cigarettes sold annually are linked to 125,000 deaths. There are three reasons why 54 million people in the United States still smoke cigarettes: (1) tobacco is addictive; (2) smoking is socially acceptable; and (3) the true cost of smoking in terms of disease and premature death is not comprehended. Not much can be done to make cigarettes less addictive, but schools and communities can reduce the social acceptability of smoking and build a better understanding of the costs of smoking. Minnesota's Omnibus Nonsmoking and Disease Prevention Act will provide funds to school boards that provide (1) in-service training of teachers and staff; (2) evaluation of prevention programs and curriculum results; (3) a continuum of educational interventions related to smoking in kindergarten through grade 12; (4) targeted intervention for students 12 to 14 years of age; and (5) a school policy that prohibits smoking by minors on school premises. It is no more defensible to legitimize smoking on school property than it would be to legitimize alcohol or drug consumption. A growing militancy against the annoyance of and potential harm from other people's smoking is a new and hopeful trend among nonsmokers. A University of Michigan study reports that regular cigarette smoking among high school seniors has declined from nearly 30 percent to less than 20 percent, a decline that has been paralleled by increases in students' understanding of the health risks of smoking. It is hoped that the new Federal Comprehensive Smoking Education Act, which requires cigarette companies to rotate health warnings on cigarette packages and in advertising, will substantially increase the public's understanding of the health threat and counteract the effects of advertising.

86–1633. Korcok, M. US **Surgeon General Ignites Furor With Findings on Smoking in the Workplace.** *Canadian Medical Association Journal* 134(7):801-804, 806, April 1986.

According to the American Federation of Labor/Congress of Industrial Organizations (AFL/CIO), the fourth Surgeon General's report on smoking and health, which indicates that smoking is the most important cause of chronic lung injury for most U.S. workers, has given employers a legal shield from worker injury liability. The labor union indicates that the report "minimizes and misrepresents the risks posed by occupational hazards" when it suggests that workers who stop smoking eliminate the risk of occupational disease, which could lead to employers avoiding spending money to clean up noxious workplace environments until workers changed their lifestyles. In a more positive appraisal, the official health report focuses attention on the workplace as the key variable in achieving a smokeless society by the year 2000. From available evidence, workplace smoking cessation programs have the greatest chance of success, primarily because of accessibility during working hours and low cost. According to a Gallup poll conducted for the American Lung Association, 87 percent of smokers and nonsmokers believe that companies should either ban smoking totally or restrict it to designated areas, and 85 percent of nonsmokers and 62 percent of current smokers believe that smokers should refrain from smoking in the presence of nonsmokers.

86–1634. Leu, R.E.; Schaub, T. **More on the Impact of Smoking on Medical Care Expenditures. (Letter).** *Social Science and Medicine* 21(7):825-827, 1985.

Smoking is unlikely to increase medical care expenses and smokers (in Switzerland) are unlikely to impose a financial burden on nonsmokers through use of publicly financed medical services. Using data from the first nationwide health survey in Switzerland to update an earlier report (*Social Science and Medicine* 17:1907-1914, 1983), it is shown that (1) smokers in Switzerland had fewer physician visits, but slightly more hospital and cure days than nonsmokers (effects canceled each other); (2) nonsmokers impose external costs on smokers, rather than vice versa as is popularly believed; and (3) the sum of all external costs resulting from smoking is more than adequately provided by tobacco tax revenues. More research is needed on the partial impact of smoking on mortality, morbidity, and medical care use, controlling for other intervening factors. It is suggested that the undisputed effects of smoking during pregnancy and on children be included in cost estimates as soon as reasonable data are available on numbers of persons exposed. Data on the effects of passive smoking should also be included.

86–1635. Omar, S.; El-Bar, M.A. **Smoking: Warrantable or Interdicted in Islam. A Review Article.** In: Forbes, W.F.; Frecker, R.C., Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 377-380.

Smoking was opposed by ancient Islamic leaders long before its adverse effects on health were known, and was prohibited by one of the Hanafi jurisprudents and theologians not only because it was harmful to health, but also because it was irritating, malodorous, and wasteful. Smoking was also considered an unnecessary expense and produced blackness under the eyes, coughing, and spitting caused by respiratory problems. Tobacco use was discouraged because of its narcotic, intoxicating effect, a condition described as smoker lassitude. Occasional lassitude was considered a minor sin, but persistent use was a major sin, particularly if the smoker found the habit pleasurable, boasted about it to others, or was a role model or scholar. In more recent history, smoking was labeled addictive by the Royal College of Physicians and a 1982 conference on religion and its attitude toward narcotics and allied substances confirmed Islamic views about smoking: it is harmful to health, wasteful, and a cause of lassitude. It is suggested that religious restraints might be a way to convince smokers of the importance and necessity of quitting smoking.

86–1636. Rosser, W.W. **Physicians for a Smoke-Free Canada.** *Canadian Medical Association Journal* 133(11):1115-1116, December 1985.

In addition to the 27,000 premature deaths annually from tobacco-related diseases, the annual estimated cost of smoking among Canadians is 2 billion health care dollars in excess of all tax revenues generated from tobacco sales. Recent studies show that the annual rate of successful cessation of smoking is only 3 percent. Although physicians have traditionally avoided political action groups, it is time for greater involvement. It was a group of concerned physicians who mounted the campaign against RJR-MacDonald Tobacco Company's sponsorship of the Canadian Amateur Ski Association's downhill skiing events that culminated in the withholding of Federal funding to any amateur sports group receiving financial support from tobacco companies. The committee developed into the "Physicians for a Smoke-Free Canada," whose goal is to stimulate Government action on smoking. A letter-writing campaign contributed to the cigarette tax increase of 25 cents/pack last May, and it is anticipated that between 5 to 10 percent of Canada's 7 million smokers will stop smoking as a result of the legislation. The proposed formation of a tobacco marketing agency to promote sales of Canadian-grown tobacco in foreign countries was condemned by the physician group and five health care agencies. It is proposed that a stronger and clearer voice at National and Provincial levels of government will accelerate the decline in tobacco consumption.

86–1637. Shah, M.B. **Quit Smoking, Gain Lost Health.** Bombay, India, Pravichar Publishers, 1985, 390 pp.

A record is presented of the lifetime experiences of a family physician who became aware of the health-related effects of smoking and tried to help patients quit. Convinced by decades of followup of smokers with many diseases found to be related to smoking, the doctor describes the addictive nature of tobacco, the many health-related effects and economic costs of tobacco, problems related to trying to quit, and steps that can be taken to control smoking and other uses of tobacco. Necessary legislation is discussed, as is the need for public health education. Case reports and anecdotes are used to illustrate pertinent points. An especially unique suggestion for reducing tobacco smoke as a source of air pollution is the Smoker's Cabin, a special room (similar to a telephone booth) to be used exclusively by smokers. Smoking would not be allowed in any other public areas. Recommendations for further antitobacco research are also included.

86–1638. Thompson, M.E.; Forbes, W.F. **Reasons for the Disagreements on the Impact of Smoking on Medical Care Expenditures: A Proposal for a Uniform Approach.** *Social Science and Medicine* 21(7):771-773, 1985.

Evaluating the costs of smoking to society must take into consideration (1) consequences of premature death; (2) reduced productivity, or loss of productive time on the job; (3) health care costs (resources used to provide medical and social services for treatment of smoking-related diseases); and (4) government welfare and disability payments paid to smokers and their dependents. Minor costs, such as the cost of fire damage to buildings and forests, should also be included. Direct costs (resources used to treat or prevent disease) should be distinguished from indirect costs (reduction in either productivity or usefulness of the diseased population). To estimate the effects of cigarette smoking on morbidity in a more quantitative manner, it is recommended that (1) medical care expenditures be reported on a per capita basis, and (2) the question of how much of the costs associated with smoking are actually the result of smoking and how much arise from other factors. Since a major proportion of health care costs are incurred by the elderly and little data on smoking status are available for this population, it is also recommended that longitudinal studies involving the elderly be given priority in estimating the health care costs of smoking.

86–1639. Weis, W.L. **The Smoke-Free Workplace: Cost and Health Consequences.** In: Forbes, W.F.; Frecker, R.C.;

Nostbakken, D. (Editors). *Proceedings of the Fifth World Conference on Smoking and Health, Winnipeg, Canada, 1983,* Volume 2. Ottawa, Canadian Council on Smoking and Health, 1983, pp. 291-297.

Compared with a nonsmoker, the average employed smoker in the United States (1) takes approximately 50 percent more sickleave; (2) uses the health care system at least 50 percent more; (3) suffers over twice the mortality rate during his working years; (4) spends 6 percent of working hours smoking; (5) causes indoor work facilities to expend six times the capital and operating outlays to maintain air circulation rates that meet building code specifications; (6) imposes a much greater maintenance burden for cleaning, repairing, repainting, and replacing furnishings and equipment; (7) imposes unnecessary costly liability on employers for damages sustained by coworkers who are forced to work in a smoky environment; and (8) exacts a high price in employee morale because of the irritation and discomfort suffered by fellow workers. Three successful smoking policies for the workplace are described: workplace restrictions, cessation incentives, and preferential hiring. Data are provided on work-loss days in the United States as a result of smoking, actual mortality rate differentials between smokers and nonsmokers, and estimated mortality rate differentials between smokers and never smokers. Discount rates and other insurance savings proposed for nonsmokers are discussed.

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ISSN: 0081-0363
NOVEMBER - DECEMBER 1986
Abstracts 86-1640 - 86-1950

Smoking and Health Bulletin

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86–1640. Khan, W.A.; Qayyum, S.M.; Tunio, K.D., et al. **Effect of Different Complex Fertilizers on the Growth and Yield of Cured Tobacco (Nicotiana Rustica L) Variety R-5.** *Pak Tobacco* 8(1):11-13, January 1984.

Different complex fertilizer effects on growth and yield of cured tobacco (*Nicotiana rustica L.*), R-5 variety, were studied in Pakistan. Treatments included four complex fertilizers: $F_1 = 12\text{-}12\text{-}12\text{-}2$; $F_2 = 13\text{-}13\text{-}13\text{-}0$; $F_3 = 14\text{-}14\text{-}14\text{-}0$; $F_4 = 10\text{-}20\text{-}20\text{-}0$, NPK Mg, and control $F_5 = 0\text{-}0\text{-}0\text{-}0$ at two levels of 90-60-60 and 90-60-100 kg NPK/ha. The F_4 (10-20-20) complex fertilizer yielded a maximum plant height of 46 cm, and maximum leaf area of 463.17 cm^2. Maximum yield of tobacco cured leaves, i.e., 1549.401 and 1495.035 kg/ha, was obtained under F_4 (10-20-20) with both doses, i.e., 90-60-60 and 90-60-100 kg NPK/ha, respectively. The Mg complex fertilizer showed no apparent effect on cured leaf yield/ha.

CHEMISTRY

86–1641. Bache, C.A.; Reid, C.M.; Hoffmann, D., et al. **Cadmium in Smoke Particulates of Regular and Filter Cigarettes Containing Low and High Cadmium Concentrations.** *Bulletin of Environmental Contamination and Toxicology* 36(3):372-375, March 1986.

Cigarette filters were effective in reducing cadmium in mainstream smoke particulates. Filter and nonfilter cigarettes were prepared from high-cadmium tobacco grown on a municipal sludge-amended soil or from low-cadmium tobacco grown on untreated soil. Cigarettes were smoked by machine; the particulate matter from mainstream smoke was trapped on a filter, wet-ashed using acids, and analyzed for cadmium by stripping voltammetry. The cadmium content of mainstream smoke particulates was 3,850±231 ng per unfiltered cigarette made of sludge-grown tobacco, and 3,600±130 ng when such cigarettes were filtered. Cadmium levels from cigarettes made of soil-grown tobacco were significantly lower ($p < 0.05$) when the cigarettes were filtered, 110.8±7.0, than when unfiltered, 153.0±138. It is suggested that the extent of cadmium reduction in mainstream cigarette smoke by filters of commercially prepared filter cigarettes may not be duplicable when filter cigarettes are prepared individually using manually operated fabricating devices.

86–1642. Horstmann, M. **Simple High-Performance Liquid Chromatographic Method for Rapid Determination of Nicotine and Cotinine in Urine.** *Journal of Chromatography* 344:391-396, November 8, 1985.

A high-performance liquid chromatographic (HPLC) method is described that differentiates between smokers and nonsmokers through rapid determination of nicotine and cotinine in human urine. Urinary cotinine is an indicator of chronic nicotine exposure, while excreted nicotine, which is rapidly detoxified, provides information about recent exposure. Under optimized conditions, with selection of mobile phases and columns, the HPLC method gives good and fast resolution of peaks. This simple, reproducible, and time-saving solvent extraction technique avoids solvent evaporation steps and achieves sufficient concentration and prepurification with small amounts of solvent. Twenty-four-hour urine samples of 56 smokers and nonsmokers (31 males, aged 13 to 36) were examined for nicotine and cotinine and compared with self-reported smoking status. Nicotine, cotinine, and internal standard peaks were well resolved with no interferences seen in the samples. However, haloperidol, chlorpromazine, amitriptyline, and cyproheptadine appeared in the chromatogram; this may also happen with other lipophilic drugs containing basic nitrogen. Calibration curves for nicotine and cotinine showed linearity over the range 0.1 to 10 μg/mL. Within-day and between-day coefficients of variation (about 5 percent or less) were acceptable for precision range and reproducibility. Creatinine excretion rates were 1.11±0.68 g/day in all subjects.

86–1643. Iskander, F.Y.; Bauer, T.L.; Klein, D.E. **Determination of 28 Elements in American Cigarette Tobacco by Neutron-Activation Analysis.** *Analyst* 111(1):107-109, January 1986.

Concentrations of 28 toxic and other elements in cigarette tobacco of 12 brands commercially manufactured in the United States were determined using instrumental neutron-activation analysis. Elements determined were aluminum (Al), arsenic (As), barium (Ba), bromine (Br), calcium (Ca), cerium (Ce), chlorine (Cl), cobalt (Co), chromium (Cr), cesium (Cs), europium (Eu), iron (Fe), hafnium (Hf), potassium (K), lanthanum (La), magnesium (Mg), manganese (Mn), sodium (Na), nickel (Ni), rubidium (Rb), antimony (Sb), scandium (Sc), selenium (Se), strontium (Sr), thorium (Th), titanium (Ti), vanadium (V), and zinc (Zn). Results were compared with elemental concentrations previously reported and with those reported for Iranian, Pakistani, and Japanese brands. Concentrations of As, Br, Ca, Eu, K, and Zn in samples under investigation were lower than those reported in 1969 for the analysis of University of Kentucky reference cigarettes, whereas concentrations of Mn and Na were higher. Contents of Al, Cl, Co, Cr, Cs, Fe, La, Sb, Sc, and S were similar to those in the reference cigarettes. Concentrations of toxic elements in American cigarettes were much lower than in other international brands. (Auth. Abs. Mod.)

86–1644. Jarvis, M.J.; Phil, M.; Russell, M.A.H. **Tar and Nicotine Yields of U.K. Cigarettes 1972-1983: Sales-Weighted Estimates From Non-Industry Sources.** *British Journal of Addiction* 80(4):429-434, December 1985.

According to sources outside the tobacco industry, sales-weighted tar and nicotine yields of cigarettes in the United Kingdom from 1972 to 1983 showed a 27 percent decline in tar yields from an average of 20.5 to 15.0 mg/cigarette, while nicotine yields over this period remained static at about 1.3 mg/cigarette. The proportion of smokers consuming low-tar brands (<11 mg) has remained at 15.0 percent since 1977, suggesting a barrier to consumer acceptability linked more closely to nicotine than to tar. A 26 percent reduction in ratio of tar to nicotine yield, from a sales-weighted average of 15.5 to 11.5, has also occurred over the decade. It is suggested that British smokers are now exposed to about 25 percent less tar than in 1972 (including the majority who have not switched to a low-tar brand) without having had to reduce nicotine intake. (Auth. Abs. Mod.)

86–1645. Manual Llanos. **The Quality of Tobacco and Its Physical and Chemical Composition (II).** *Tabak Journal International* 1:32-34, February 1986.

Principal chemical compounds of tobacco and their relationship to quality of the product are described in the second of a two-part series on the quality of tobacco. For systematization, tobacco components were divided into water and dry material, with the latter further divided into inorganic compounds (or mineral substances) contained in ash and organic compounds. Organic compounds are classified into two groups, those containing and those not containing nitrogen. A discussion of the product from industrial, commercial, and health aspects follows. (Auth. Abs. Mod.)

86–1646. Munari, M. **Quantitative Determination of Nicotine Content in Protein Extracted From Tobacco.** *Tabak Journal International* 2:128, 130, 132, 134, April 1986.

Using tobacco as a primary source of protein depends upon establishing and perfecting methods for determining and quantifying possible contaminating substances, e.g., nicotine, in insufficiently purified protein material. The best results of various procedures for extracting and quantifying nicotine in protein fractions of tobacco were obtained with liquid-liquid extraction using the ethyl ether solvent as the faster and more reproducible process of concentration. Optimization of this process required at least two successive extractions and the addition of 4N hydrochloric acid. A check of the gas chromotographic dosage method for quantifying the nicotine extraction, using anethole as the internal standard, indicated a standard deviation of only 1.16 percent for the extracted nicotine measurements. A further check of overall evaluation effectiveness for the method of dosage was performed using additions of known quantities of standard nicotine to the original sample, and then verifying that the previously used methods of extractions and measurements could account for these additions.

86–1647. Rickert, W.S.; Collishaw, N.E.; Bray, D.F., et al. **Estimates of Maximum or Average Cigarette Tar, Nicotine, and Carbon Monoxide Yields Can Be Obtained From Yields Under Standard Conditions.** *Preventive Medicine* 15(1):82-91, January 1986.

Average yields of tar, nicotine, and carbon monoxide per liter of smoke and per cigarette were determined for 10 brands of cigarettes smoked under 27 different conditions (1 standard, 26 nonstandard). Per cigarette yields were highly variable across smoking conditions owing to differences in total volume of smoke taken for analysis. The results of a simple linear regression analysis indicated that up to 95 percent of variation in tar yield per cigarette could be explained by variations in total volume of smoke produced per cigarette. Per liter yields for tar, nicotine, and carbon monoxide were almost constant over the conditions investigated. Since most smokers inhale less than this amount, yields per liter provide a rough estimate of the maximum amount to which a smoker might be exposed. Yields per liter, taken over all 26 conditions, were highly correlated with per cigarette yields under standard conditions. Consequently, values on one scale can be converted to the other, at least for the 10 brands investigated. The average conversion factor for tar, nicotine, and carbon monoxide is 2.5 when proceeding from milligrams per king-size cigarette under standard conditions to milligrams per liter. This relationship is true for both vented and nonvented cigarettes when ventilation holes are not blocked. (Auth. Abs.)

86–1648. Schmid, E.R.; Bachlechner, G.; Varmuza, K., et al. **Determination of Polycyclic Aromatic Hydrocarbons, Polycyclic Aromatic Sulfur and Oxygen Heterocycles in Cigarette Smoke Condensate.** *Zeitschrift fur Analytische Chemie* 322:213-219, 1985.

Polycyclic aromatic hydrocarbons (PAHs), polycyclic aromatic sulfur (PASHs), and polycyclic aromatic oxygen heterocycles (PAOHs) were separated from cigarette smoke condensate (CSC) by liquid-liquid extractions and silicagel column chromatography and further fractionated by high-performance liquid chromatograph (HPLC). Individual polycyclic aromatic compounds (PAC) were characterized according to their retention time with a fast-scanning UV-spectrophotometer, a *photo diode array detector*. A final separation was achieved by gas chromatography (GC) with fused silica capillaries. In addition to standard flame ionization and gas chromatography-mass spectrometry (GC-MS), sulfur-specific detections were also conducted with a flame photometric detector or by mass spectrometry in the selected ion-monitoring (SIM) mode. The CHS-ion, present in all electron impact mass spectra of PASHs, was selected and mass spectrometrically recorded at a resolution higher than 4000. Additional information concerning PAC isomers was obtained via chromatographic retention times and indices. Retention indices and GC-MS, especially the fast scanning UV-spectrophotometer in HPLC and sulfur-specific detection in GC, provided valuable additional information. Of the two methods for characterization of PASHs, the SIM technique proved to be especially sensitive and selective. (Auth. Abs. Mod.)

86–1649. Sexton, M.; Nowicki, P.; Hebel, J.R. **Verification of Smoking Status by Thiocyanate in Unrefrigerated, Mailed Saliva Samples.** *Preventive Medicine* 15(1):28-34, January 1986.

The ability to verify smoking status by thiocyanate determination in unrefrigerated, mailed saliva samples should eliminate the need for direct, face-to-face contact with study subjects at their location. Saliva samples from pregnant women participating in a randomized clinical trial of smoking cessation were mailed to the laboratory for thiocyanate determination. For comparison, salivary thiocyanate was also measured after standard techniques were used to collect saliva from nonsmoking pregnant women. Although there may have been a 1-week delay between collection and analysis, results show that thiocyanate from unrefrigerated, mailed samples of saliva (1) distinguishes reported smokers from nonsmokers, (2) is positively associated with the amount of smoking, and (3) is negatively associated with length of cessation. Findings are consistent with results from other studies in which samples of serum or saliva were collected and shipped under conditions requiring the presence of a staff member. (Auth. Abs. Mod.)

86–1650. Waliszewski, S.M.; Szymczynski, G.A. **Determination of Chlorinated Pesticides in Tobacco.** *Bulletin of Environmental Contamination and Toxicology* 36(2):230-233, February 1986.

A recently developed method for determining residues of chlorinated pesticides in tobacco is described. This method simplifies analysis and reduces its cost by replacing adsorbents with 1 mL of concentrated sulfuric acid. Chlorinated pesticides are separated from a tobacco sample by using acetonitrile in water. This is further processed with 5 percent sodium sulfate and petroleum ether prior to addition of concentrated sulfuric acid. The dried residue is analyzed using a nitrogen gas carrier flowing into a gas chromatograph to qualitatively and quantitatively identify the pesticides. The precision of the method was verified in recovery studies of tobacco samples repeated 10 times. Mean recoveries for analyzed samples ranged from 88.2 percent for delta-HCH to 98.5 percent for p,p'-DDT; standard deviations and coefficients of variation were all less than 8 percent.

86–1651. Wong, T.K.; Blanton, T.E.; Hunnicutt, C.K., et al. **Quantification of Aryl Hydrocarbon Hydroxylase and 7-Ethoxycoumarin *O*-Deethylase Activity in Human Placentae: Development of a Protocol Suitable for Studying Effects of Environmental Exposures on Human Metabolism.** *Placenta* 6(4):297-310, July-August 1985.

The utility of the human placenta for determining mixed-function oxidase (MFO) enzyme activity in response to xenobiotic compounds such as polycyclic aromatic hydrocarbons in cigarette smoke was examined. Several issues regarding measurement of aryl hydrocarbon hydroxylase (AHH) and 7-ethoxycoumarin activity (7ECD) in placentae of smokers were studied and standardized procedures for measuring MFO induction in epidemiological studies were compared. In the AHH assay, deletion of rat liver supernatant eliminated a possible extraneous contribution to measurement of low levels of activity without substantially affecting measurement of higher levels of activity. Increasing protein concentration of placentae homogenate from 2 to 6 mg, and duration of incubation from 20 to 60 minutes, allowed more benzo(*a*)pyrene products to accumulate, potentially maximizing detection of low-level AHH activity. Using tissue homogenates was more convenient without interfering with interindividual comparisons of activity. Assay of homogenates of fresh and frozen tissue from the same placenta gave similar results. Product degradation was modest in AHH assays. Efficiency of extraction of fluorescent products declined with increasing protein concentrations in the reaction mixture of AHH assays, but remained stable for a range of product concentrations and was controlled by using a constant amount of protein per assay. Product recovery for 7ECD assay was more complete and not affected by protein concentration; 7ECD activity was easily detected in every placenta, regardless of smoking exposure. The AHH assay appeared to be better for discriminating between smokers and nonsmokers. It is concluded that both assays are potentially useful measures of human MFO induction in clinical and epidemiological studies. (Auth. Abs. Mod.)

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86–1652. Beani, L.; Bianchi, C.; Nilsson, L., et al. **The Effect of Nicotine and Cytisine on ^{3}H-Acetylcholine Release From Cortical Slices of Guinea-Pig Brain.** *Naunyn-Schmiedeberg's Archives of Pharmacology* 331(2-3):293-296, November 1985.

Nicotine 1.8 x 10^{-5} to 1.8 x 10^{-4} mol/L enhanced spontaneous ^{3}H-efflux from guinea pig cortical slices preloaded with ^{3}H-choline and perfused in presence of hemicholinium (HC-3). Facilitation of tritium outflow was prevented by tetrodotoxin 5 x 10^{-7} mol/L and by D-tubocurarine 4.5 x 10^{-6} mol/L. Nicotine 1.8 x 10^{-6} to 1.8 x 10^{-4} mol/L and the agonist cytisine 5 x 10^{-7} to 5 x 10^{-5} mol/L increased, in a concentration-dependent way, ^{3}H-efflux from electrically stimulated slices (0.2 Hz). Concentration response curves of both drugs were shifted in parallel to the right by D-tubocurarine 4.5 x 10^{-6} mol/L. EC_{50} values (i.e., concentrations required to cause a 50 percent increase in the S_2/S_1 ratio) changed for nicotine from 5.58 x 10^{-5} to 4.34 x 10^{-4} and for cytisine from 6.3 x 10^{-6} to 2.75 x 10^{-4} mol/L in absence and in presence of the antagonist, respectively. In the range of 0.2 to 2 Hz, the magnitude of the nicotine effect was inversely related to rate of stimulation. Response to nicotine was subject to rapidly developing tachyphylaxis; it was resistant to atropine. It is concluded that nicotine and cytisine facilitate ^{3}H-efflux from cholinergic nerve endings of guinea pig cerebral cortex. This effect involves sodium-dependent mechanisms and is the result of an interaction of drugs with receptors showing affinity for D-tubocurarine. (Auth. Abs. Mod.)

86–1653. Blanton, R.H.; Lyte, M.; Myers, M.J., et al. **Immunomodulation by Polyaromatic Hydrocarbons in Mice and Murine Cells.** *Cancer Research* 46(6):2735-2739, June 1986.

Immunosuppressive effects of benzo(*a*)pyrene (BaP) are multicellular in origin, occur apart from carcinogenic effects of chemicals, and cannot be attributed merely to cellular toxicity. Several functionally defined in vitro antibody generating systems were used to assess the immunomodulating mechanisms of benzopyrenes. When BaP or benzo(*e*)pyrene (BeP) was incorporated into a T-dependent antibody (TDAb)-producing spleen cell culture system, dose- and time-dependent inhibition of plaque-forming cell responses was observed. Addition of BaP at 0.002 μg/mL (7.93 nM) resulted in suppression of the TDAb plaque-forming cell response. BeP-induced suppression was seen at the 2-μg level (7.93 μM). Time course evaluations demonstrated an early requirement for either chemical in culture to induce significant suppression. In vitro incorporation of BaP and BeP into polyclonal antibody-generating cultures also resulted in dose-related inhibition. Inhibition of antibody responses was also noted following in vivo exposure of mice to BaP or BeP. Fourteen-day exposure of mice to BaP (40 mg/kg) resulted in 98 percent suppression of the TDAb response. Polyclonal antibody responses were reduced 50 to 66 percent following 7 days of chemical exposure. BeP caused 51 percent suppression of TDAb response following 14-day exposure of animals. (Auth. Abs. Mod.)

86–1654. Blanusa, M.; Kralj, Z.; Bunarevic, A. **Interaction of Cadmium, Zinc and Copper in Relation to Smoking Habit, Age and Histopathological Findings in Human Kidney Cortex.** *Archives of Toxicology* 58(2):115-117, December 1985.

Factor analysis revealed that trace amounts of cadmium, zinc, and copper in the human kidney cortex were related to smoking habit, age, and histopathological findings in 51 post mortem samples. Significantly higher concentrations of cadmium and zinc found in smokers indicate an equimolar enhancement of both elements (1.4 mol) resulting from the smoking habit. In both Varimax and Oblimin solutions, the first factor was clearly associated with smoking habit, cadmium, and zinc, confirming previous associations of the same variables. The second factor clustered histopathological findings and age, which reflects normal morphological deterioration of the kidney with age. Although the proportion of histopathological changes was higher in smokers (69 percent) than in nonsmokers (35 percent), no connection was found between smoking habit and the histopathological findings. Given smokers' high intake of cadmium and other toxic agents, it is surprising that morphological kidney changes were not enhanced. No association of age and trace metals was found, although their dependence had been reported earlier.

86–1655. Chretien, J.; Danel, C. **Tobacco Smoke and Alveolar Cell Populations.** *Ettore Majorana Science Series. Life Sciences* 17:137-159, 1984.

Tobacco smoke is a complex aerosol with a gas and a particulate phase; physical clearance of these two phases differs. An investigation of direct alteration or modification of alveolar cells as a result of chronic inhalation of tobacco smoke requires considering alveolar cells as two groups, i.e., mobile cells derived from blood and provisionally resident in the lung, and fixed pulmonary cells. Morphological changes in alveolar macrophage functions in smokers are discussed in light of (1) clearance functions based on pinocytosis, phagocytosis, and bactericidal activity; (2) secretory functions related to enzymatic activity; and (3) immune and inflammatory responses. The effects of tobacco smoke on fixed cells in the bronchoalveolar unit are less known in man and less studied in animal experiments. Tobacco smoke may induce an increase of monooxygenase activity. Surfactant in experimental animals exposed to cigarette smoke has been shown to decrease. Alveolo-capillary membrane permeability has been found to increase in smokers; the activity is attributed to cell junctions in the alveolar surface and bronchiolar epithelium. It is suggested that further study concern Pneumocytes I and II, clara cells, septal cells, and endothelial cells, which have not been examined in man.

86–1656. Cundy, K.C.; Crooks, P.A. ***In Vitro* Characteristics of Guinea Pig Lung Aromatic Azaheterocycle *N*-Methyltransferase.** *Drug Metabolism and Disposition* 13(6):658-663, November-December 1985.

In vitro characteristics of guinea pig lung aromatic azaheterocycle *N*-methyltransferase were determined, using *R*-(+)-nicotine as substrate. The enzyme is a cytosolic, *S*-adenosyl-L-methionine-dependent *N*-methyltransferase exhibiting apparent K_M values of 14.2 and 13.2 μM for *R*-(+)-nicotine and *S*-adenosyl-L-methionine, respectively. The pH and temperature optima for enzyme activity were 7.4 and 37°C, respectively. An interesting stereospecificity was demonstrated for nicotine enantiomers toward *N*-methyltransferase. *S*-(—)-Nicotine acts as a competitive inhibitor of the *N*-methylation of its optical antipode by the above enzyme, which also exhibits potent feedback inhibition by *S*-adenosyl-L-homocysteine. Neither *S*-(—)-cotinine nor nicotinamide is a substrate for the enzyme; however, the latter compound did act as a weak competitive inhibitor of the *N*-methylation of *R*-(+)-nicotine. (Auth. Abs. Mod.)

86–1657. Dengerink, H.A.; Wright, J.W.; Miller, J.M., et al. **The Effects of Nicotine on Laser Doppler Measures of Cochlear Blood Flow.** *Hearing Research* 20(1):31-36, 1985.

Nicotine-induced changes in cochlear blood flow (CBF) were measured by a laser Doppler flowmeter, revealing that moderate doses of nicotine elevate CBF to a greater extent and for a longer period than does saline. Anesthetized guinea pigs were given arterial infusions of 0.25 mL saline or 0.01 to 0.2 μg/kg nicotine. Blood flow through the cochlea and skin were measured using a laser Doppler flowmeter, and arterial blood pressure was measured by means of an arterial cannula. Cochlear blood flow decreased for up to 2 minutes with the highest dose of nicotine, but increased with lower doses; blood pressure increased and skin flow decreased with all doses. Saline vehicle had only minor and transient effects. (Auth. Abs. Mod.)

86–1658. Foss, O.P.; Lund-Larsen, P.G. **Serum Thiocyanate and Smoking: Interpretation of Serum Thiocyanate Levels Observed in a Large Health Study.** *Scandinavian Journal of Clinical and Laboratory Investigation* 46:245-251, 1986.

Serum thiocyanate cannot distinguish all nonsmokers from smokers, but by choosing suitable "cut-off levels" it is possible to extract from the total population groups consisting of a large majority of smokers and only a few nonsmokers and vice versa. In a Norwegian health study involving 25,300 persons (9,412 cigarette smokers, 909 pipe smokers, 33 cigar smokers, and 14,120 nonsmokers) the mean serum thiocyanate level in nonsmokers was 33.9 μmol/L for males and 33.5 μmol/L for females. In moderate smokers (5 to 9 cigarettes/day) the mean level was 87.3 μmol/L in males and 99.7 μmol/L in females. The difference between thiocyanate levels in females and males smoking the same number of cigarettes can be explained by sex differences in distribution volume for thiocyanate. Among nonsmokers, the mean level of serum thiocyanate was the same whether persons had been indirectly exposed to tobacco smoke or not. Mean serum thiocyanate levels were up to 10 μmol/L higher in the last 6 months of the year than in the first, which is explained by seasonal variations in the content of thiocyanate in the diet. The range of individual thiocyanate level was great both in nonsmokers and in smokers, resulting in a large overlap. (Auth. Abs. Mod.)

86–1659. Frischer, R.E.; El-Kawa, N.M.; Strand, F.L. **ACTH Peptides as Organizers of Neuronal Patterns in Development: Maturation of the Rat Neuromuscular Junction as Seen by Scanning Electron Microscopy.** *Peptides* 6(Supplement 2):13-19, 1985.

Normal postnatal neonatal rat neuromuscular junction development and maturational changes evoked by ACTH/MSH 4-10 (10 μg/kg/day ip) or ACTH/MSH 4-9 (0.01 μg/kg/day ip) in pups treated with nicotine during prenatal and postnatal life, or only during the gestation period, were compared by scanning electron microscopy. Pregnant females received 0.25 mg/kg twice daily ip; neonates 0.05 mg/kg/day sc. Peptide treatment with either ACTH/MSH 4-10 or ACTH/MSH 4-9 accelerated maturation of the endplate, as demonstrated by increased convolution of folds covering a greater endplate area. Similar effects were seen after nicotine treatment with most marked maturation resulting from a combination of pre- and postnatal nicotine administration. Pups receiving nicotine only during the prenatal period showed somewhat less effect. Both nicotine and ACTH peptides increased motor activity. Studies show that ACTH peptides such as nicotine stimulate protein synthesis in central neurons of adult rats. Nicotine, whether absorbed from cigarette smoke or administered by ip injection, causes rapid release of ACTH, a phenomenon that precedes the rise in plasma corticosterone and which is probably dependent upon hypothalamic secretion of corticotrophin-releasing hormone via nicotinic receptors. Similarities between ACTH and nicotine actions on the nervous system suggest that the observed changes in morphology of the developing neuromuscular junction following nicotine exposure may be mediated through nicotine-evoked ACTH release. (Auth. Abs. Mod.)

86–1660. Gamse, R.; Saria, A.; Lundberg, J.M., et al. **Behavioral and Neurochemical Changes After Intracisternal Capsaicin Treatment of the Guinea Pig.** *Neuroscience Letters* 64(3):287-292, March 14, 1986.

Guinea pigs treated intracisternally (IC) with 125 to 150 μg capsaicin and tested 1 week later showed reduced behavioral responses to irritating stimuli, including cigarette smoke. The number of wiping reactions following 30-second exposure to five puffs of smoke was reduced by 43 percent after treatment.

Also noted were reduced behavioral responses to ether vapor, hot water applied to the forepaw or ear, and capsaicin applied to the eyes or nose. Concentrations of substance P- and neurokinin-immunoreactivity were decreased in the medulla oblongata but not in the trigeminal root of IC-treated animals. It is suggested that IC capsaicin causes a degeneration of the central terminals of chemo- and thermonociceptive neurons, some containing the putative neurotransmitters substance P and neurokinin. (Auth. Abs. Mod.)

86–1661. González-Rothi, R.J.; Harris, J.O. **Effects of Low-Yield-Cigarette Smoke Inhalation on Rat Lung Macrophages.** *Journal of Toxicology and Environmental Health* 17(2-3):221-228, 1986.

Tobacco in low-yield cigarettes may produce toxic effects similar to those of high-yield cigarettes. Low-yield cigarettes are likely to be less hazardous only if smoked in a manner similar to that of smoke-generating apparatuses. The effects of smoke from a typical low-yield cigarette on phagolysosome fusion and phagocytosis in alveolar macrophages were studied in rats after chronic inhalation of smoke generated by an intermittently puffing apparatus. Alveolar macrophages were obtained by lung lavage and established in monolayers. Phagolysosome fusion and phagocytosis were assessed using acridine orange fluorochrome assay. Phagolysosome fusion was no different between controls and smokers after 8-week exposure. Carboxyhemoglobin levels in controls versus smokers were 1.36 ± 0.09 percent vs. 2.13 ± 0.32 percent ($p = 0.06$). Another group of animals was similarly exposed, but the side pores of the cigarette filters were sealed with tape to simulate compensatory behaviors often used by low-yield cigarette smokers in lip and fingertip filter pore occlusion to increase smoke exposure. The carboxyhemoglobin level of smokers increased to 7.0 ± 1.4 percent (vs. controls, $p \leq 0.01$). Cells in these rats showed alternations in phagocytosis and in phagolysosome fusion compared with alveolar macrophages of control rats. (Auth. Abs. Mod.)

86–1662. Jansson, T. **Unscheduled DNA Synthesis in Human Lymphocytes Treated With Cigarette Smoke Condensate and Its Semivolatile Fraction.** *Hereditas* 103(2):201-204, 1985.

The scintillometric method used to detect unscheduled DNA synthesis (UDS) in human lymphocytes was found to be insufficiently sensitive for genetic risk assessment of cigarette smoke condensate (CSC) fractions or for detecting any DNA repair activity. Exposed cells were incubated with tritiated thymidine and the UDS was determined by liquid scintillation counting of precipitated DNA. Tests were performed with and without metabolic activation by liver fraction (S9) from rats induced with Aroclor 1254. No UDS activity was detected for the CSC or its semivolatile fraction. Two control substances, benzo(*a*)pyrene and methyl methanesulfonate, increased the UDS activity in tests with and without metabolic activation, respectively. (Auth. Abs. Mod.)

86–1663. Jongen, W.M.F.; Hakkert, B.C.; van de Poll, M.L.M. **Inhibitory Effects of the Phorbolester TPA and Cigarette Smoke Condensate on the Mutagenicity of Benzo(*a*)pyrene in a Co-Cultivation System.** *Mutation Research* 159(1-2):133-138, 1986.

The transport of reactive intermediates was studied in a co-cultivation system of primary chick embryo hepatocytes and V79 Chinese hamster cells; two test systems with different genetic endpoints were used: sister-chromatid exchange (SCE) and gene mutation at the hypoxanthine-guanine phosphoribosyl transferase (HGPRT) locus. Benzo(*a*)pyrene (BaP) was positive in both test systems. When V79 cells were co-cultivated with hepatocytes at a distance of 1 mm, only a slight increase in the number of SCEs was observed after exposure to BaP. When the two cell types were in direct contact, addition of phorbolester TPA or cigarette smoke condensate inhibited by 50 percent the mutagenic effects of BaP in both assays. No influence of TPA on SCE induction by BaP was observed in a preincubation assay using Aroclor-1254-induced rat liver homogenate. Results indicate that metabolic cooperation may play a role in the transport of reactive intermediates in this co-cultivation system. Mutagenic potential of compounds may be underestimated in systems using intact cells for metabolic activation if the compounds or their metabolites are capable of inhibiting metabolic cooperation. (Auth. Abs. Mod.)

86–1664. Kachur, J.F.; May, E.L.; Awaya, H., et al. **Pharmacological Effects of 1,2,3,5,6,10b-Hexahydropyrido(2,3g)indolizine, A Bridged-Nicotine Analog.** *Life Sciences* 38(4):323-330, January 27, 1986.

The racemate of a bridged-nicotine (BN) analog was synthesized and resolved into its enantiomers for pharmacological comparisons to (+)- and (—)-nicotine. The EC50 values for (—)- and (+)-nicotine and (—)- and (+)-BN were 4, 170, 53, and 400 μM, respectively, for producing contractions of guinea pig ilea. (—)-Nicotine was an effective antinociceptive agent in the mouse tail flick procedure at i.v. doses of 0.1 to 0.3 mg/kg, whereas isomers of BN failed to alter tail flick response in doses up to 5 mg/kg. (—)-Nicotine (0.01 to 0.3 mg/kg, i.v.) increased blood pressure and decreased heart rate in anesthetized rats. Neither (+)- nor (—)-BN altered blood pressure and heart rate in rats in this dosage range. At doses of 3 to 100 mg/kg, (+)-BN produced an increase in blood pressure without changing heart rate, while (—)-BN decreased both blood pressure and heart rate. Bridging the pyrrolidine and pyridine rings decreased biologic activity and did not result in stereoselectivity greater than that observed with (+)- and (—)-nicotine. It appears that there may be subpopulations of nicotine receptors with which isomers of BN do not interact. (Auth. Abs. Mod.)

86–1665. Kulkarni, M.S.; Calloway, K.; Irigaray, M.F., et al. **Species Differences in the Formation of Benzo(*a*)pyrene-DNA Adducts in Rodent and Human Endometrium.** *Cancer Research* 46(6):2888-2891, June 1986.

anti-Benzo(*a*)pyrene-7,8-diol-9,10-epoxide was the predominant adduct identified in endometrial tissue of humans, hamsters, mice, and rats examined for formation of adducts of benzo(*a*)pyrene metabolites on DNA. The amount of (+)-*anti*-benzo(*a*)pyrene-7,8-diol-9,10-epoxide bound to DNA from human endometrium was approximately three times greater than to DNA from hamster tissue. Among the three animal species, the level of adduct was highest in hamsters and lowest in rats. High pressure liquid chromatography profiles of adducts formed in endometrium from humans and hamsters were similar, but the specific activity of each adduct formed was different. *syn*-7,8-Dihydroxy-9,10-epoxy-7,8,9,10-tetrahydrobenzo(*a*)pyrene adduct was present in humans, hamsters, and rats but was not detected in mouse endometrium. An unidentified adduct was present only in rat tissue. Rats had the lowest level of total DNA-bound radioactivity and 53 percent of the total was eluted as an uncharacterized radioactive peak eluting with water. Results demonstrate that endometrial tissues from humans and three rodent species differ with regard to quantities and proportions of benzo(*a*)pyrene-DNA adducts formed from benzo(*a*)pyrene. (Auth. Abs. Mod.)

86–1666. Lee-Jane, W.L.; Disher, R.M.; Reddy, M.V., et al. **^{32}P-Postlabeling Assay in Mice of Transplacental DNA Damage Induced by the Environmental Carcinogens Safrole, 4-Aminobiphenyl, and Benzo(*a*)pyrene.** *Cancer Research* 46(6):3046-3054, June 1986.

Safrole (600 μmol/kg p.o.), 4-aminobiphenyl (800 μmol/kg), and benzo(*a*)pyrene (BaP, 200 μmol/kg) binding to DNA varied quantitatively and qualitatively in maternal and fetal liver, lung, kidney, heart, brain, intestine, skin, maternal uterus, and placenta of pregnant mice. A sensitive ^{32}P-postlabeling method was used to analyze DNA adduct patterns. The covalent binding index (CBI, μmol adducted nucleotides per mol of DNA nucleotides/μmol carcinogen administered per g body weight) 24 hours after safrole treatment ranged from 0.1 to 247 and 0.1 to 5.8 for maternal and fetal DNA, respectively. CBI values of 0.2 to 13 and 0.1 to 0.3 for maternal and fetal DNA, respectively, were found for 4-aminobiphenyl. BaP treatment yielded CBI values of 0.6 to 6.5 and 0.3 to 0.7 for maternal and fetal DNA, respectively. Safrole preferentially bound to liver DNA, 4-aminobiphenyl to DNA of maternal liver and kidney with no preference among fetal tissues, and BaP exhibited weak tissue preference in both maternal and fetal organs. For all compounds studied, the fetal adduct levels were generally lower than corresponding maternal adduct levels. It is suggested that DNA damage in rapidly proliferating tissues may play a critical role in transplacental carcinogenesis. (Auth. Abs. Mod.)

86–1667. Mousa, S.; van Loon, G.R.; Houdi, A.A., et al. **High-Performance Liquid Chromatography With Electrochemical Detection for the Determination of Nicotine and N-Methylnicotinium Ion.** *Journal of Chromatography* 347(3):405-410, November 1985.

A sensitive and selective high-performance liquid chromatography system with electrochemical detection has been developed for analyzing nicotine and N-methylnicotinium ion sensitive to high picogram levels in blood, tissue, and urine of animals and humans exposed to tobacco smoke compounds. Chromatographic separation of nicotine and N-methylnicotinium ion from the oxidation metabolites cotinine, 3-hydroxycotinine, and nicotine-N′-oxide was achieved using mixtures of 90-95 percent primary buffer and 5-10 percent secondary buffer in the isocratic mode. A convenient system was developed using 92.5 percent primary mobile phase and 7.5 percent secondary mobile phase at a flow-rate of 1.20 mL/min, isocratically. This method of separation and detection of nicotine and N-methylnicotinium ion from closely related oxidation products provides strong evidence supporting the involvement of the pyrrolidine N, and not the pyridine N, lone pair of electrons in the oxidation mechanism.

86–1668. Mussalo-Rauhamaa, H.; Salmela, S.S.; Leppanen, A., et al. **Cigarettes as a Source of Some Trace and Heavy Metals and Pesticides in Man.** *Archives of Environmental Health* 41(1):49-55, January-February 1986.

No differences were found in trace and heavy metal contents of different tobacco brands sold in Finland during 1920 to 1984, based on atomic absorption spectroscopy and gas chromatography-mass spectrometry analyses. Pesticide residues in tobacco, correlating closely with their use on tobacco plantations, show that dichlorodiphenyltrichloroethane in tobacco has decreased during the past 20 years to about 1/200 of the peak value, i.e., from 34.5 to 0.17 μg/g. Cigarette filters significantly prevent the inhalation of trace and heavy metals. In 1960 to 1980, the mean contents in filter cigarette tobacco samples were cadmium, 1.7 μg/g; copper, 15.6 μg/g; lead, 2.4 μg/g; magnesium, 6.4 mg/g; and iron, 0.5 mg/g. In a smoking experiment, an average of 2.0 percent cadmium, 1.0 percent zinc, 0.2 percent copper, 5.8 percent lead, <0.001 percent magnesium, and 0.06 percent iron passed into mainstream smoke. About 20 to 50 percent of cadmium was found in ashes and stumps of smoked cigarettes, indicating that a large amount passes to sidestream smoke and may be contaminating passive smokers in proximity to smokers. The number of years smoked and the number of cigarettes smoked/day were predictive of the effect of smoking on cadmium content in fat tissue of male smokers; mean cadmium content was four times that of nonsmokers ($p=0.03$). (Auth. Abs. Mod.)

86–1669. Ong, T.-M.; Whong, W.-Z.; Stewart, J., et al. **Chlorophyllin: A Potent Antimutagen Against Environmental and Dietary Complex Mixtures.** *Mutation Research* 173(2):111-115, February 1986.

Chlorophyllin is potentially useful as an antimutagenic agent. The sodium and copper salt of chlorophyll, chlorophyllin was tested for its antimutagenic activity against a variety of complex environmental and dietary mixtures, including cigarette smoke, tobacco snuff, and chewing tobacco, in strain

TA98 of *Salmonella typhimurium*. Chlorophyllin effectively inhibited mutagenic activity in extracts of airborne particles, cigarette smoke, fried shredded pork, and fried beef. Generally, complete inhibition was obtained with 1.25 mg of chlorophyllin/plate. It also strongly inhibited (92 to 98 percent) mutagenic activity in extracts of diesel emission particles, coal dust, red grape juice, and red wine, but at chlorophyllin concentrations greater than 1.25 mg/plate. The only complex mixtures whose mutagenicities were inhibited less than 90 percent by chlorophyllin were extracts of tobacco snuff and chewing tobacco, which were inhibited 75 to 80 percent by 10 mg of chlorophyllin/plate. Control and reconstruction experiments showed that chlorophyllin was not toxic to *S. typhimurium* at concentrations used. The mechanism of chlorophyllin antimutagenicity in these experiments was not known; however, chlorophyllin is an antioxidant. It is suggested that scavenging of radicals or interaction with active mutagenic compounds may be responsible for its antimutagenic activity. (Auth. Abs. Mod.)

86–1670. Peach, H.; Shah, D.; Morris, R.W. **Validity of Smokers' Information About Present and Past Cigarette Brands—Implications for Studies of the Effects of Falling Tar Yields of Cigarettes on Health.** *Thorax* 41(3):203-207, March 1986.

Current smokers should be asked to return empty cigarette packs with self-administered questionnaires. Followup studies for which cigarette brands smoked were previously recorded might be more valid than studies relying on smokers' recall. A total of 429 current smokers and ex-smokers interviewed 12 years earlier on smoking habits were asked to complete a self-administered questionnaire about present and past smoking and 2 weeks later to send empty cigarette packs. The tar group and brand name of the current cigarette given on the questionnaire were compared with details on the cigarette pack, and the brand alleged to have been smoked 12 years ago was compared with that actually recorded at that time. Only 55 percent of "low middle" tar cigarettes as indicated by returned packs had been correctly identified in the questionnaire. The brand name was confirmed by past records in only 49 percent of cases. Of the men who smoked cigarettes at the start of the study (Heart Disease Prevention Project), 216 admitted that they could not recall the brand of cigarette smoked at that time. A further 43 wrongly claimed not to have been smoking at the start of the project. The agreement was greater for hand-rolled cigarettes (71 percent) than for manufactured cigarettes (44 percent). It is suggested that the validity of smokers' information about present and past cigarette brands may affect results for past and future studies of effects of falling cigarette tar yields on health. (Auth. Abs. Mod.)

86–1671. Quimby, G.F.; Bonnice, C.A.; Burstein, S.H., et al. **Active Smoking Depresses Prostaglandin Synthesis in Human Gastric Mucosa.** *Annals of Internal Medicine* 104(5):616-619, May 1986.

Active smoking causes a transient decrease in prostaglandin synthesis in fundic and antral mucosae. The depression of prostaglandin synthesis may help explain slower ulcer healing and predisposition to ulcer recurrence in smokers. To determine the effect of smoking on gastroduodenal mucosal prostaglandin synthesis, endoscopies were done after an overnight fast on 10 nonsmokers, 12 active smokers (1 to 2 packs/day) who smoked 4 cigarettes/hour before endoscopy, and on 11 smokers who refrained from smoking for 12 hours. Biopsy samples of fundic, antral, and duodenal mucosae were incubated, and the accumulation of prostaglandin E_2 and 6-keto-prostaglandin $F_{1\alpha}$ in the incubation medium was measured by radioimmunoassay. Accumulation of prostaglandins in the medium was assumed to reflect mucosal synthesis. Comparison of active and inactive smoking showed that active smoking significantly depressed 6-keto-prostaglandin $F_{1\alpha}$ synthesis in antral and fundic mucosa and prostaglandin E_2 synthesis in antral mucosa. Comparison of smokers and inactive smokers showed no difference in prostaglandin synthesis. (Auth. Abs. Mod.)

86–1672. Robert, M.E.; Leung, F.W.; Guth, P.H. **Nicotine and Smoking Do Not Decrease Basal Gastric Mucosal Blood Flow in Anesthetized Rats.** *Digestive Diseases and Sciences* 31(5):530-534, May 1986.

Neither intravenous nicotine nor cigarette smoke, with or without nicotine, had significant effects on basal gastric mucosal blood flow in anesthetized rats, as measured by hydrogen gas clearance. Blood flow was determined before, during, and after treatment. Although blood flow tended to decrease with nicotine at 40 µg/kg/min, none of the differences between treatment and pre- or post-treatment periods were statistically significant. Animals receiving the 40 µg dose exhibited a transient increase in blood pressure within 1 minute, followed by a gradual return to baseline 5 to 10 minutes after onset of nicotine infusion. Blood pressure during the actual flow measurement, however, was not different from baseline in these animals. Although half of the animals received both types of cigarette smoke in a different order than the other half, no order effect was observed in gastric mucosal blood flow measurements. Hypotension produced by hemorrhage significantly decreased mucosal blood flow. (Auth. Abs. Mod.)

86–1673. Rogers, D.F.; Williams, D.A.; Jeffery, P.K. **Nicotine Does Not Cause "Bronchitis" in the Rat.** *Clinical Science* 70(5):427-433, May 1986.

Nicotine, a major constituent of cigarette smoke, is also used as a chewing gum additive to help patients stop smoking. To study the effects of nicotine on the number of epithelial secretory cells in the airways of rats, nicotine hydrogen(+)tartrate (L-isomer) was administered to pathogen-free rats for 2 or 3 weeks and the number of secretory cells in the surface epithelium of airways was determined. By aerosol, a dose giving 10 ng nicotine/mL of plasma had no effect on secretory cell number. By injection, nicotine had a "bi-phasic" effect depending on dose; it reduced secretory cell number at plasma concentrations of 650 ng/mL of plasma or increased it at 2,360 ng/mL of plasma. Thus, when nicotine was inhaled by rats as a low-dose aerosol, plasma nicotine levels were similar to those found in cigarette smokers and gum chewers, but did not cause bronchitis. The higher nicotine plasma levels that caused changes in secretory cell numbers greatly exceeded those seen in cigarette smokers. It is concluded that it is unlikely that only nicotine in cigarette smoke is responsible for secretory cell hyperplasia associated with smoking and later development of chronic bronchitis. (Auth. Abs. Mod.)

86–1674. Rolinski, Z.; Herbut, M. **The Significance of Central Nicotine Receptors in the Aggression of Isolated Mice.** *Polish Journal of Pharmacology and Pharmacy* 37(4):479-486, July-August 1985.

The effects of nicotine and the nicotinic antagonists mecamylamine HCl and hexamethonium bromide on aggressive behavior of isolated mice were studied. Nicotine potentiated aggressiveness at intraperitoneal (ip) doses of 0.5 to 2 mg/kg and intraventricular (icv) doses of 0.005 to 0.06 mg/mouse. Higher doses (4 mg/kg ip or 0.09 mg/mouse icv) significantly inhibited aggressiveness. Mecamylamine HCl potentiated mouse aggression at 2 mg/kg ip, but a dose ≥ 4 mg/kg ip inhibited it; this latter effect was reversed upon nicotine administration. Hexamethonium bromide increased aggression at 2 to 8 mg/kg ip. It is concluded that central nicotinic receptors play a role in mediating aggression in isolated mice.

86–1675. Saracci, R. **Assessing Exposure of Individuals in the Identification of Disease Determinants.** In: IARC Scientific Publications No. 59, pp. 135-142, 1984.

Advantages, disadvantages, and problems assessing exposure at the individual level (i.e., by biological markers) rather than at group level (i.e., in epidemiological research) for identifying chronic disease determinants and quantifying size of their effects are reviewed using the relationship between tobacco consumption and lung cancer deaths. The following conclusions are discussed. Each marker must be considered individually, with merits and demerits of one not automatically transfering to another. Questions of acceptability, practicability, and costs for large-scale studies and technical aspects should be included in the consideration. Markers of exposure in the strict sense, particularly those that may reflect integrated exposure to specific compounds over several weeks (e.g., hemoglobin adducts), appear to be the most attractive. A need exists to calibrate progress from exposure itself to exposure markers, e.g., early and late lesions, in parallel in both animals and man so that extrapolation from experimental systems to man may be made without too much uncertainty, and without awaiting full natural history of a disease before getting necessary answers. It is suggested that particular attention be given to confounding factors in this type of calibration, and that a certain amount of ingenuity, backed by a collaboration of epidemiologists, toxicologists, and experimental scientists, is required to identify appropriate study designs, particularly in man. Use of biological markers in epidemiological investigation appears most useful and less debatable in those situations where external environmental measurements or questionnaire information are insufficient to define individual exposure, e.g., in problems of general environmental atmospheric pollution, and as a complement to environmental measurements and questionnaire information in selected situations.

86–1676. Saxe, T.G. **Drug-Alcohol Interactions.** *American Family Physician* 33(4):159-162, April 1986.

Potentially life-threatening drug-alcohol interactions fall into three broad categories: (1) the disulfiram reaction, leading to vasodilation, flushing, headache, and tachycardia; (2) central nervous system depression, leading to excessive sedation and respiratory depression; and (3) other adverse interactions, including those resulting from combining tobacco and alcohol. Tobacco contains nicotine, tars, and many other active ingredients. Alcoholics who smoke have an increased risk of nasopharyngeal, esophageal, and upper respiratory cancers and gastrointestinal bleeding. Smoking has been clearly labeled a risk factor for heart disease, and it is suspected that excessive alcohol use enhances development of hypertension. Heavy smoking and alcohol consumption are also risk factors for osteoporosis. Since heavy drinkers are frequently also heavy smokers, it is recommended that physicians be aware of the potential health hazards of alcohol-drug interaction and consider an alcohol-drug interaction in diagnosing patients who become ill. Patients who drink should be informed of adverse reactions resulting from mixing some medications with alcohol.

86–1677. Saxena, K.; Scheman, A. **Suicide Plan by Nicotine Poisoning: A Review of Nicotine Toxicity.** *Veterinary and Human Toxicology* 27(6):495-497, December 1985.

The etiology, diagnosis, and management of accidental or deliberate nicotine poisoning are discussed, emphasizing what may be encountered by the primary care physician in a variety of clinical settings. Cases documented include three accidental poisonings and an attempted suicide by a depressed patient using nicotine extracted from snuff as a lethal drug. Nicotine is consumed predominantly through tobacco products such as cigarettes, cigars, chewing tobacco leaves, snuff, and more recently, nicotine gum. Nicotine is also found in insecticides and in dog control products. Historically, it has been a vehicle for suicidal and accidental poisonings. Early manifestations of clinical overdose include nausea and vomiting, increased salivation (or foaming at the mouth in severe cases), pale skin, diaphoresis, confusion, dizziness, ataxia, headache, and vision or hearing changes. Cardiovascular effects include initially elevated blood pressure and pulse, followed by hypotension and bradycardia, possibly leading to cardiovascular collapse secondary to shock. Neurological effects consist of generalized stimulation followed by generalized inhibition. In extreme cases, grand mal seizures or hypotonia and decreased deep tendon reflexes can occur. Death, when it occurs, usually results from respiratory failure or cardiovascular collapse within 1 hour of nicotine ingestion. Nicotine overdose can be verified by a urine toxicology screen utilizing chromatography. Since there is no specific antidote for nicotine, management consists of supportive measures such as administration of syrup of ipecac to induce emesis, use of activated charcoal or a cathartic, gastric lavage, acidification of urine, and increase of fluids. Intensive respiratory support is vital to prevent a fatal outcome.

86–1678. Serfontein, W.J.; Ubbink, J.B.; De Villiers, L.S., et al. **Depressed Plasma Pyridoxal-5'-Phosphate Levels in Tobacco-Smoking Men.** *Atherosclerosis* 59(3):341-346, March 1986.

Tobacco smoking and increasing age, two major risk factors for coronary artery disease, were associated with lower plasma pyridoxal-5'-phosphate levels (PLP). Of 249 men, tobacco smokers (43 percent) showed considerably lower plasma PLP levels ($p<0.001$) than nonsmokers; plasma pyridoxal (PL) levels of smokers were also reduced, but this difference was not significant ($p=0.098$). Plasma PLP and PL levels were closely correlated. Stepwise multiple linear regression demonstrated that 32.3 percent of PLP variation could be explained in terms of PL levels, while 40 percent of PLP variation could be explained by smoking and age. Thus, age, PL level, and smoking were important determinants of plasma PLP levels. The inverse relationship between age and plasma PLP levels was confirmed, but no relationship between age and plasma PL could be demonstrated. (Auth. Abs. Mod.)

86–1679. Singh, A.P.; Parvez, H.; Verma, H.N. **Biochemical and Behavioural Studies on a New Tobacco Ingredient: Tobacco Mosaic Virus.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 47-53.

Tobacco Mosaic Virus (TMV), alone and with nicotine, appears to be a pharmacologically active constituent of tobacco that alters certain cellular neurophysiological mechanisms and related behavior patterns in rats. Significant increases in binding of ^{3}H-spiroperidol, ^{3}H-QNB, and ^{3}H-DNA in brain samples of rats treated with nicotine and TMV suggest an involvement at dopamine, acetylcholine, and noradrenaline receptor levels. Normal locomotor activity increased significantly within 5 minutes in all animals treated with TMV, suggesting development of sensitivity of neurons associated with motor functions and supersensitivity of catecholaminergic receptors. Amphetamine produced increased movements and stereotypy of forward climbing, paddling, nodding, and rearing in normal and nicotine-treated rats within 10 minutes of its administration, whereas activity was very low in groups receiving TMV alone or with nicotine. This pattern reversed after a lapse of 30 minutes, when rats receiving TMV or TMV plus nicotine exhibited similar increased activity and the others returned to normal.

86–1680. Sloan, J.W.; Martin, W.R.; Hernandez, J., et al. **Binding Characteristics of (—)- and (+)-Nicotine to the Rat Brain P_2 Fraction.** *Pharmacology Biochemistry and Behavior* 23(6):987-993, December 1985.

Saturation studies employing (—)- and (+)-(^{3}H)nicotine indicate that isomers bind to different very high and high affinity sites, since the binding density for (—)-(^{3}H)nicotine is 10 times that for (+)-(^{3}H)nicotine. Both isomers also bind to a low affinity site ($K_{D}s$ = 10^{-5} to 10^{-4} M). Competition studies employing unlabeled (—)- and (+)-nicotine reveal greater complexities. Isomers also appear to bind to a separate site that enhances binding at the (—)- and (+)-nicotine high affinity sites. (+)-Nicotine is more effective in increasing the binding of (—)-(^{3}H)nicotine at its high affinity site than (—)-nicotine. In addition, (+)-nicotine has a greater specificity for enhancing binding than (—)-nicotine in that it enhances (—)-(^{3}H)nicotine binding at lower concentrations and inhibits binding at higher concentrations than (—)-nicotine. (Auth. Abs. Mod.)

86–1681. Sonnenfeld, G.; Griffith, R.B.; Hudgens, R.W. **The Effect of Smoke Generation and Manipulation Variables on the Cytotoxicity of Mainstream and Sidestream Cigarette Smoke to Monolayer Cultures of L-929 Cells.** *Archives of Toxicology* 58(2):120-122, December 1985.

The gas phase of cigarette smoke may be of primary importance in generating observed toxic effects. Monolayer cultures of mouse fibroblast-like L-929 cells were simultaneously exposed to mainstream (MS) and sidestream (SS) smoke from the same cigarette. Cytotoxicity of MS smoke decreased with increasing smoke age (up to 8.7 seconds), smoke dilution, and quantity of charcoal-activated filters. Acetate filters had little effect on cell mortality, and the age-of-smoke effect was not evident for MS smoke generated with a low puff volume and rapid dilution. Cytotoxicity of SS smoke also decreased rapidly with increasing smoke age and dilution. Mortality could be controlled by dilution of smoke. Results may be significant for tobacco and health research in defining requirements for a less toxic cigarette, in considering hazards of SS smoke, and in evaluating in vivo inhalation studies. (Auth. Abs. Mod.)

86–1682. Sonnenfeld, G.; Hudgens, R.W. **Effect of Sidestream and Mainstream Smoke Exposure on *in Vitro* Interferon-α/β Production by L-929 Cells.** *Cancer Research* 46(6):2779-2783, June 1986.

Exposure of L-929 murine culture cells to machine-generated mainstream and sidestream cigarette smoke inhibited in vitro interferon-α/β induction, but cells could be protected from these effects by smoke manipulation. A peristaltic pump smoking machine generated simultaneous active and passive smoke from a University of Kentucky 2R1 reference cigarette. Dosages used were the highest possible with minimum toxic effect, and were serially diluted to lower doses. Dosages were determined by the number of smoke puffs, volume of smoke, and total particulate matter deposited on Cambridge filters in the smoke machine. Viability of exposed cells was equivalent to that of controls. Interferon-α/β was induced by addition of polyriboinosinic-polyribocytidylic acid to the cells. Interferon production was substantially reduced in viable cells exposed to mainstream or sidestream smoke. Aging of smoke by delaying cell exposure time to smoke, or filtration of smoke through activated charcoal substantially decreased alteration of interferon production by smoke exposure. (Auth. Abs. Mod.)

86–1683. Stamford, B.A.; Matter, S.; Fell, R.D., et al. **Effects of Smoking Cessation on Weight Gain, Metabolic Rate, Caloric Consumption, and Blood Lipids.** *American Journal of Clinical Nutrition* 43(4):486-494, April 1986.

With weight gain being a likely outcome of smoking cessation, the extent of change in caloric consumption and/or metabolic rate was measured in 13 sedentary adult women who successfully quit smoking for 48 days. Mean caloric consumption for the 13 subjects during the 30-day baseline period was 1,765 kcal, increasing significantly ($p < 0.01$) to 1,992 kcal during cessation, for an average of 227 kcal. Mean weight gain was 2.2 kg. Determination of fatness revealed that 96 percent of weight gained was in the form of fat, with 4 percent lean tissue and water. No measurable acute effects of smoke inhalation and no chronic net effects of smoking cessation on resting metabolic rate determined by oxygen consumption and respiratory exchange ratio were observed. After 1 year, subjects who continued to abstain gained an average of 8.2 kg. Increased caloric consumption accounted for 69 percent of weight gained immediately following smoking cessation. High-density cholesterol increased 7 mg/dL in 48 days, but this effect was lost in those who resumed smoking. Factors other than changes in caloric consumption and metabolic rate may be responsible for a significant proportion (31 percent) of weight gained by individuals who quit smoking. (Auth. Abs. Mod.)

86–1684. Szechinski, J.; Skoczynska, A.; Smolik, R., et al. **Serum Angiotensin-Converting Enzyme Levels in Patients With Silicosis.** *Journal of Toxicology and Environmental Health* 17(1):73-79, 1986.

Silicosis patients (smokers and nonsmokers), either in nodular or progressive massive fibrosis stage, have only moderately elevated serum angiotensin-converting enzyme (ACE) levels. Patients with silicotuberculosis had significantly increased serum ACE levels. Mean serum ACE level in 26 male granite workers from Lower Silesia in Poland exposed to silica from 5 to 32 years (mean exposure 24.5 years) was 45.2 ± 16.0, compared with 38.1 ± 10.6 nmol/min x mL in 30 controls. All patients, aged from 43 to 69 years (mean age 57 years) and classified into smokers and nonsmokers, had radiographically advanced stages of silicosis, 14 with nodular silicosis, and 12 with progressive massive fibrosis. Arterial blood analyses showed a mean P_aO_2 value of 74.4 for non- and ex-smokers and a value of 63.2 for smokers (two older silicotuberculosis and nodular silicosis patients had < 60 values). S_aO_2 values were > 93.2 percent for non- and ex-smokers, and > 86.0 percent for smokers (one older patient with 82.0 percent). There was no significant difference in serum ACE levels among smokers vs. nonsmokers in the control group. It is suggested that significantly elevated serum ACE levels associated with silicotuberculosis may be helpful in screening for this condition.

86–1685. Toivanen, J.; Ylikorkala, O.; Viinikka, L. **Effects of Smoking and Nicotine on Human Prostacyclin and Thromboxane Production *in Vivo* and *in Vitro*.** *Toxicology and Applied Pharmacology* 82(2):301-306, February 1986.

Increased production of thromboxane A_2 (TxA_2) following cigarette smoking may partly explain the increased incidence of atherosclerosis and its complications in cigarette smokers. Smoking and nicotine effects on the production of proaggregatory TxA_2 and antiaggregatory prostacyclin (epoprostenol, PGI_2) and on lipid peroxidation were studied in 19 healthy occasional smokers (aged 20 to 25 years). In vivo serum concentrations of thromboxane B_2 (TxB_2), a stable metabolite of TxA_2, increased immediately after smoking three cigarettes but not after smoking the equivalent amount of tobacco in a pipe; serum lipid peroxide values did not change in either group. In vitro, nicotine (2×10^{-3} mol/L) inhibited pulmonary TxB_2 production by 70 percent; simultaneously, production of 6-keto-prostaglandin $F_{1\alpha}$, a stable metabolite of PGI_2, was stimulated by 40 percent, suggesting that nicotine does not exert its effect at the cyclooxygenase level. During aggregation in platelet-rich plasma, TxB_2 production was inhibited by 53 percent with 2×10^{-4} mol/L of nicotine; during whole blood clotting, the inhibition was 34 percent with 2×10^{-4} mol/L of nicotine. It is suggested that the rise in cigarette smokers' serum TxB_2 was probably caused by some constituent of cigarette smoke other than nicotine. (Auth. Abs. Mod.)

86–1686. Tuomilehto, J.; Tanskanen, A.; Salonen, J.T., et al. **Effects of Smoking and Stopping Smoking on Serum High-Density Lipoprotein Cholesterol Levels in a Representative Population Sample.** *Preventive Medicine* 15(1):35-45, January 1986.

Smoking history and its association with serum high-density lipoprotein (HDL) levels were assessed in a random population sample of 939 men and 853 women from eastern Finland. Those who had recently stopped smoking had higher serum HDL cholesterol levels and higher HDL/total cholesterol ratios than current smokers. Prevalence of smoking was highest in men aged 25 to 44 years (36.0 percent) and in women aged 14 to 24 years (20.8 percent). The proportion of men who had stopped smoking for at least 1 year was highest in those aged 45 to 64 years (39.7 percent); in women this proportion was highest in the 14 to 24 age group (13.2 percent). Amount of daily smoking measured by serum thiocyanate concentration was negatively and independently associated with serum HDL cholesterol level and HDL/total cholesterol ratio in men. This negative association seemed largely to be the result of low HDL cholesterol levels in heavy smokers. Both male and female current smokers had lower HDL cholesterol levels and HDL/total cholesterol ratios than those who had never smoked. This difference was found even after adjustment for age, body mass index, and beer drinking. (Auth. Abs. Mod.)

86–1687. Uppal, R.; Sharma, P.L.; Prakash, C., et al. **Tolbutamide Kinetics in Cigarette Smokers in the Indian Population.** *International Journal of Clinical Pharmacology, Therapy and Toxicology* 24(2):82-84, February 1986.

Chronic smoking affected kinetics of tolbutamide, an oral hypoglycemic sulfonylurea metabolized exclusively by the liver. A single oral dose of 500 mg was administered to nine chronic cigarette smokers (average consumption 25 cigarettes/day for 4 to 20 years) and eight healthy nonsmokers. The drug is rapidly absorbed after oral administration, reaching peak concentrations in 1 to 3 hours. Plasma tolbutamide half-life was shortened in smokers, but the difference was not statistically significant. However, time concentration, peak concentration, and time to peak concentration were reduced significantly in smokers, confirming that tolbutamide is metabolized/excreted faster in smokers than in nonsmokers and indicating that smokers may require larger doses or more frequent administration of the drug to obtain sustained therapeutic response. (Auth. Abs. Mod.)

86–1688. Van Lunteren, E.; Haxhiu, M.A.; Cherniack, N.S. **Stimulation of Respiratory Changes in Alae Nasi Length by Chemoreceptor Activation.** *Respiration Physiology* 63(3):361-373, March 1986.

Nicotine in high doses appears to have relatively greater effects on alae nasi length changes during expiration than during inspiration. Respiratory-related changes in length of the nasal dilator muscle were measured using sonomicrometry in 10 anesthetized, tracheostomized, spontaneously breathing dogs. Piezoelectric crystals were inserted 7 to 25 mm apart along the direction of the alae nasi muscle fibers, and effects of progressive hyperoxic hypercapnia and nicotine (10-500 μg given intravenously) were ascertained. The alae nasi shortened during inspiration in all animals, started to lengthen again toward the end of inspiration, returned to resting length during the first portion of expiration (Te-1), and remained at resting length for the remainder of expiration (Te-2). The amount of alae nasi inspiratory shortening was increased by occluding the airway for a single breath. Progressive hypercapnia caused progressive increases in the amount and velocity of nasal muscle inspiratory shortening during both unoccluded and occluded breaths; similar stimulatory effects on inspiratory shortening were seen following nicotine administration. Both chemoreceptor stimulants caused a delay in the return of the muscle to its resting length during expiration, resulting in a significant increase in Te-1 relative to T(Te-1/T) and a greater amount of nasal muscle shortening to be present during Te-1. In some animals these agents also caused tonic shortening of the alae nasi, so that the muscle never returned to its resting length. Results suggest that inspiratory shortening of the alae nasi is inhibited by vagal inputs, but that chemoreceptor activation increases the amount of muscle shortening during both inspiration and early expiration. (Auth. Abs. Mod.)

86–1689. Walter, S.; Walter, A. **Smoking and Blood Basophils. (Letter).** *Thorax* 41(4):335, April 1986.

Cigarette smokers had significantly higher absolute blood basophil counts (47.0 (SD 17.12)/mm^3) than nonsmokers (34.2 (15.71)/mm^3, $p<0.001$) in a study of 107 healthy young smokers (55 smokers and 52 nonsmokers matched for age, height, and weight) with relatively short smoking histories. In another study of the immediate effects of smoking on blood basophils in a group of 25 young male smokers, a significant decrease in the counts was found (mean fall 10 percent, $p<0.02$). This decrease is probably due to degranulation of these cells, as shown in the study of 27 young smokers who demonstrated a significant increase in percentage of degranulated cells ($p<0.001$) in the peripheral blood soon after smoking. These data show that cigarette smoking has significant effects on blood basophils. Since basophils are important mediators of the allergic response, these finding support the observations (*Thorax* 40:9-16, 17-22, January 1985) that cigarette smoking and the development of allergic manifestations may be interrelated in those with a constitutional predisposition.

86–1690. Williams, P.T.; Krauss, R.M.; Wood, P.D., et al. **Lipoprotein Subfractions of Runners and Sedentary Men.** *Metabolism* 35(1):45-52, January 1986.

Serum concentrations of lipoprotein mass by flotation rate were measured in 12 male long-distance runners and 81 sedentary men (17 smokers, mean consumption 14.9 cigarettes/day) by analytic ultracentrifugation. The runners had significantly lower serum mass concentrations of smaller, denser low-density lipoprotein (LDL) particles of flotation rates S_f 0-7 (including the LDL-II, LDL-III, and LDL-IV subspecies), very low-density lipoprotein (VLDL) particles of S_f 20-400, and high-density lipoprotein (HDL) particles of flotation rates $F_{1.20}$ 0-1.5 (predominantly the HDL_3 subspecies), and higher serum mass concentrations of HDL particles with flotation rates between $F_{1.20}$ 2.0-9.0 (including HDL_{2a} and HDL_{2b} and less dense particles belonging to HDL_3) than did sedentary men. Sedentary smokers had significantly lower ($p \leq 0.05$) plasma HDL-cholesterol (mean ±SD: 44.9±8.5 vs. 49.6±8.7 mg/dL) and serum HDL-mass of both the predominantly HDL_2 density region of $F_{1.20}$ 3.5-9.0 (29.2±31.0 vs. 4.7±31.0 mg/dL) and the predominantly HDL_3 density region of $F_{1.20}$ 0-3.5 (212.5±35.4 vs. 236.6±35.7 mg/dL) than sedentary nonsmokers. In a comparison of runners and nonrunners with smokers excluded, lipoprotein lipase activity was higher and hepatic lipase activity was lower in runners than in sedentary men. It is suggested that effect of endurance exercise training to lower LDL may be specific to smaller, denser LDL particle region. Similarities in lipoprotein mass profiles of these runners and the low-risk profiles of sedentary, middle-aged women suggest effects of common metabolic factors possibly leading to reduced risk of coronary heart disease. (Auth. Abs. Mod.)

86–1691. Wilmer, J.W.G.M.; Spit, B.J. **Influence of Retinoids on the Mutagenicity of Cigarette-Smoke Condensate in *Salmonella typhimurium* TA98.** *Mutation Research* 173(1):9-11, 1986.

Three different retinoids (all-*trans*-retinol, all-*trans*-retinoid acid, and all-*trans*-retinyl acetate) had neither an enhancing nor an inhibitory effect on the mutagenic activity of cigarette smoke condensate (CSC) in *Salmonella typhimurium* TA98. Three different retinoids tested up to 500 nmols/plate showed no mutagenic potency with TA98 in the presence of 10 percent rat liver S9 mix, and no toxic effects within the dose range used; CSC showed an almost linear dose response. Results of combination experiments of CSC with different retinoids showed a slight tendency of retinoids to decrease mutagenicity of CSC, particularly at 400 μg/plate, although statistical evaluation of results revealed no significant effects. It is suggested that effects of retinoids on the mutagenicity of CSC be studied at different S9 levels.

86–1692. Yanagisawa, Y.; Nishimura, H.; Matsuki, H., et al. **Personal Exposure and Health Effect Relationship for NO_2 With Urinary Hydroxyproline to Creatinine Ratio as Indicator.** *Archives of Environmental Health* 41(1):41-48, January-February 1986.

Urinary hydroxyproline to creatinine ratio (HOP:C) was significantly correlated with nitrogen dioxide exposure (ENO_2) and number of cigarettes smoked actively or passively; ENO_2, however, had no correlation with intensity of smoking. About 800 mothers of primary schoolchildren were chosen from a community in central Tokyo and from a suburban town 50 km outside Tokyo. Air quality in both areas was measured and daily average ENO_2 exposure determined during wintertime by a newly developed personal monitor exposed for 24 hours. HOP:C in urine samples collected early in the morning of the day for ENO_2 measurement was used as a biochemical indicator of the health effect of NO_2 exposure. Approximately 15 percent of mothers were active smokers (mean 13.5 cigarettes/day), 6 percent were ex-smokers, and 64 percent were passive smokers (exposed to mean 23.2 cigarettes/day). Seventy-four percent were housewives who remained at home. Stepwise multiple regression analysis revealed that HOP:C could be predicted by ENO_2 and smoking habits at a high confidence level. Regression analysis of the active smokers' group indicated that a few cigarettes was enough to increase the HOP:C, while in the case of passive smoking, HOP:C increased proportionally to the number of cigarettes. (Auth. Abs. Mod.)

86–1693. Yong, V.W.; Perry, T.L. **Monoamine Oxidase B, Smoking, and Parkinson's Disease.** *Journal of the Neurological Sciences* 72(2-3):265-272, February 1986.

Idiopathic Parkinson's disease (PD), for unknown reasons, has been reported to occur more commonly among nonsmokers than among cigarette smokers. PD may possibly be caused by one or more unidentified neurotoxins that chemically resemble N-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP), a substance that after conversion to an active neurotoxin by monoamine oxidase B (MAO-B), can extensively damage dopaminergic nigrostriatal neurons in humans, lower primates, and mice. Enzyme activities of MAO-B measured in autopsied brain of PD patients and control subjects were similar. Inhibition of rat liver MAO-B by urine of PD patients was greater than by urine of control subjects. Observations do not support the hypothesis that idiopathic PD is the result of excessive conversion of a precursor compound to an active neurotoxin by MAO-B. MAO-B activity was significantly lower in platelets of heavy cigarette smokers (≥20 cigarettes/day) than in those of nonsmokers. Hydrazine, a compound present in tobacco smoke, had a significant effect in mice in protecting dopaminergic nigrostriatal neurons from damage by MPTP. It is suggested that if idiopathic PD is caused by MPTP-like neurotoxins, accumulation of hydrazine in tissue of cigarette smokers might explain their reduced likelihood of developing PD. (Auth. Abs. Mod.)

See also, **86–1649, 86–1899**

MORTALITY AND MORBIDITY

86–1694. Miller, G.H. **Is the Longevity Gender Gap Decreasing?** *New York State Journal of Medicine* 86(2):59-60, February 1986.

Smoking, the latest theory explaining male-female longevity difference (MFLD) giving women an 8-year excess life expectancy, is examined against a number of arguments. Only a small percentage of men smoked for long periods of time prior to World War I. Smoking patterns among men changed shortly afterward as a direct result of heavy cigarette advertising and general popular acceptance of smoking. Blacks, who until World War II had little extra money to buy cigarettes, were issued cigarettes in the military service or were able to afford cigarettes through high-paying defense jobs. Thus, blacks were introduced to cigarettes several decades later than whites. This delay in taking up smoking may explain why MFLD for people other than white was behind that for whites from 1920 to 1960. By 1980, the total smoking years of the black population had approached that of the white population. The smoking theory may also explain the decrease in MFLD in whites, because total smoking years of women is now beginning to approach that of men. If the male-female longevity difference continues to decrease for the next few decades, then the cigarette smoking hypothesis will have strong support as the most likely explanation for MFLD. On the basis of present trends in cigarette consumption, total smoking years of women will gradually approach that of men in the next 40 to 50 years. If the smoking theory is correct, the MFLD will gradually disappear.

86–1695. Waldron, I. **The Contribution of Smoking to Sex Differences in Mortality.** *Public Health Reports* 101(2):163-173, March-April 1986.

The contribution of smoking to sex differences in mortality estimated from studies of nonsmokers and comparable general population samples appears to decrease from approximately two-thirds at age 40 to approximately one-quarter at age 80. Over the adult age span, the proportion of sex differences in total mortality attributable to smoking is estimated to be about 40 to 60 percent. Findings for ischemic heart disease mortality show a similar pattern, but for lung cancer, about 90 percent of the sex difference in mortality is attributable to smoking. Data from samples drawn from the U.S. population in the late 1950s to 1980 are generally consistent with other studies, once methodological factors are taken into account. Estimated contributions of smoking included both effects of sex differences in smoking habits and effects of sex differences in the increase in mortality caused by smoking. Caution in interpretation of quantitative results is advised, since several lines of argument suggest that multivariate analyses controlling for other relevant factors might produce lower estimates of the contribution of smoking to sex differences in mortality. Despite this limitation, findings analyzed in this review, together with additional evidence from related research, strongly support the conclusion that cigarette smoking makes a major contribution to men's higher mortality, but other factors also play an important role. (Auth. Abs. Mod.)

See also, **86–1703**

NEOPLASTIC DISEASES

86–1696. Abbotts, J.; Loeb, L.A. **Smoking and Lung Cancer: An Overview. Reply 1. (Letter).** *Cancer Research* 46(6):3201-3202, June 1986.

Suggestions that the "synchronous" increase in lung cancer among both men and women is the result of improved diagnostic methods rather than by smoking (*Cancer Research* 46(6):3200-3201, June 1986) are not substantiated by referenced data. A replot of data on a linear scale shows more definitely that from 1930 to 1950, lung cancer rates among men rose more rapidly than rates among women. Moreover, the analysis was halted at 1955, just before lung cancer rates in men reached a plateau, while rates in women continue to rise to this day. With regard to intervention trial studies, it is suggested that the normal case vs. special intervention may not have received the strict adherence necessary and is not, therefore, a reliable example for cited statistical questioning. Arrayed against this skepticism is an overwhelming body of evidence in Surgeon General reports since 1964. Cigarette smoke contains numerous carcinogens, tumor initiators, tumor promoters, cocarcinogens, and mutagens. Cigarette smoking has been associated with lung cancer in men and in women, cancers at other sites, heart disease, and chronic obstructive lung disease; current evidence links deleterious health effects with passive smoking. The scientific debate on smoking and health was over long ago; the tobacco industry lost. Discussions should now address the best methods of reducing the preventable epidemic of smoking-related diseases.

86–1697. Archer, V.E. **Underground Mining, Smoking, and Lung Cancer. (Letter).** *Journal of the National Cancer Institute* 76(3):553, March 1986.

The reported synergism between smoking and radon daughter exposure (*Journal of the National Cancer Institute* 74:1207-1213, 1985), failed to note demographic differences between smokers and nonsmokers, thus causing divergent case—control study results. Despite small numbers, it is clear that compared with smokers, nonsmokers started mining earlier, had longer induction-latent periods (ILPs), and were older at lung cancer diagnosis. In addition to longer ILP among nonsmokers, the older a man when first exposed, the shorter his ILP. When following a cohort of exposed miners, lung cancers will appear among smokers and nonsmokers at different times. Therefore, studies that collect lung cancer for only the first 20 or 30 years after start of mining or over only a few calendar years may well yield different results, depending on interplay of several age and smoking factors in the population from which the lung cancers are drawn. If nonsmokers enter the work force at a different time or age than smokers or if lung cancers are collected over short time periods, the results will be markedly different. Differences in ILP and age at cancer diagnosis are explained by the hypothesis that a given amount of radon daughters initiates a finite number of cancers with latent periods dependent on age at exposure, but are shortened by the promoting action of cigarette smoke. The interactive effect may appear to be synergistic, additive, or antagonistic, depending on the time period after exposure during which subsequent cancers are collected.

86–1698. Baron, J.A. **Cigarette Smoking and Endometrial Cancer. (Letter).** *American Journal of Obstetrics and Gynecology* 154(4):965, April 1986.

The endometrial cancer risk for women under 55 years of age, found to be reduced approximately 20 percent among women currently smoking (*American Journal of Obstetrics and Gynecology* 151:899-905, 1985), supports previous reports of a negative association between cigarette smoking and cancer of the endometrium, at least in older or postmenopausal women. The mechanisms that might underlie these associations are not clear, but there is evidence that cigarette smoking acts to antagonize estrogen effects in women and in this way may lower the risks of endometrial cancer. Another example of this antiestrogenic effect is the earlier menopause experienced by smokers (on average about 1 to 1.5 years earlier than nonsmokers), but this alone could probably not explain a meaningful decrease in endometrial cancer risk, since a menopausal age shift of this magnitude would be associated only with a small change in risk. A major contribution of this study is a demonstration that the effect of cigarette smoking may be weaker in younger age groups. Given that premenopausal women differ hormonally from postmenopausal women, it is not surprising to see such a modification by age of the effect of smoking. Ex-smokers seem to revert to the same risk status as never-smokers; this is also true for the relationship between smoking and age at natural menopause and suggests that the hormonal effects of smoking are reversible.

86–1699. Brinton, L.A.; Schairer, C.; Haenszel, W., et al. **Cigarette Smoking and Invasive Cervical Cancer.** *Journal of the American Medical Association* 255(23):3265-3269, June 20, 1986.

Cigarette smoking appears to be causally linked to invasive squamous cell cervical cancer, probably through a late-stage or promotional event, but the mechanisms of action require further explanation. The relationship of several cigarette smoking variables to cervical cancer risk was evaluated in a case—control study of 480 patients with invasive cervical cancer and 797 population controls. Although smoking was correlated with both age at first intercourse and number of sexual partners, a significant smoking-related risk persisted for squamous cell carcinoma after adjustment for these factors (relative risk, 1.5). Risk of squamous cell cancers increased significantly with intensity and duration of smoking. Twofold excess risks were seen for those smoking ≥ 40 cigarettes/day and those smoking for ≥ 40 years. Users of nonfilter cigarettes were at particularly high risk; however, increased risks were observed only among recent and continuous smokers. In contrast to squamous cell cancer, no relationship was observed between smoking and risk of adenocarcinoma or adenosquamous carcinoma.

86–1700. Burch, P.R.J. **Smoking and Lung Cancer: An Overview. (Letter).** *Cancer Research* 46(6):3200-3201, June 1986.

Evidence that smoking causes 30 to 40 percent of cancer deaths (*Cancer Research* 44:5940-5958, 1984) would have been more balanced had the discussion included alternatives to the causal interpretation of positive associations and studies aiming to discriminate between them. Three of four rules of scientific inference are pertinent to evaluate smoking, or effects related to smoking, as causal for lung cancer: (1) smoking causes the disease ("causal" hypothesis); (2) a third factor creates a disposition for both smoking and the disease ("common cause" hypothesis); or (3) a combination of these two. Data from several past studies do not conclusively prove that smoking causes lung cancer, although the converse has not been shown. Testing methodologies and weaknesses of several examples from research literature question the endorsement of the Surgeon General's reports on smoking and health. Criteria used in these reports on the association of smoking to incidence of lung cancer (i.e., consistency, strength, specificity, temporal relationship, and coherence) are poorly defined. The increasing trend of smoking and lung cancer in separate sexes over consecutive 5-year periods from 1901 to 1955 in England and Wales may have been caused by other factors and complicated by newly emerging diagnostic techniques. It is advocated that randomized trial methods rather than normal care vs. intervention techniques be used.

86–1701. Celikoglu, S.I.; Aykan, T.B.; Karayel, T., et al. **Frequency of Distribution According to Histological Types of Lung Cancer in the Tracheobronchial Tree.** *Respiration* 49(2):152-156, 1986.

Lung carcinoma investigated for cell type incidence and location within bronchi of 355 patients revealed a predilection for epidermoid and small cell carcinomas in upper lobes, suggesting a relationship to tobacco smoke inhalation. Carcinoma was situated only in the trachea of 5 patients, but in the remaining 350 cases, cell types other than adenocarcinoma had different locations following their cell type. Epidermoid carcinoma was found more frequently in the two upper lobes ($p < 0.001$); small cell carcinomas showed predilection for the main bronchus on the right side and the upper lobe in the left ($p < 0.001$). No difference could be found between the upper and lower lobes and main bronchi for adenocarcinoma. Large cell carcinomas were situated more often in the right upper lobe. Experimental investigations with radioactive xenon have shown that initial inspiratory volume containing mainly dead space air first goes into the upper lobes. It is suggested that during smoking, smoke initially concentrates in the upper lobe bronchi and accumulates with successive inhalations, resulting in much more prolonged and intense contact with bronchial mucosa. (Auth. Abs. Mod.)

86–1702. Churg, A.; Wiggs, B. **Mineral Particles, Mineral Fibers, and Lung Cancer.** *Environmental Research* 37(2):364-372, 1985.

Total fibrous and nonfibrous mineral content of the lung was analyzed in 14 men with lung cancer but with no history of occupational dust exposure and in 14 male controls matched for age, smoking history, and general occupational class. Lung cancer patients had an average of 525±369 x 10^6 exogenous mineral particles and 17.4±19.6 x 10^6 exogenous mineral fibers/g dry lung, while controls had averages of 261±175 mineral particles and 4.7±3.2 x 10^6 mineral fibers/g dry lung. Kaolinite, talc, mica, feldspars, and crystalline silica represented the majority of particles in both groups. About 90 percent of the particles were smaller than 2 μm in diameter and about 60 percent smaller than 1 μm; mean particle size in the cancer group was 1.1±0.2 μm and in the control group 1.3±0.2 μm. In both groups, patients who had smoked more than 35 pack-years had greater numbers of particles than patients who had smoked less than 35 pack-years. It is concluded that smoking influences long-term retention of particles from all sources in the lungs. (Auth. Abs. Mod.)

86–1703. Depue, R.H.; Kagey, B.T.; Heid, M.F. **A Proportional Mortality Study of the Acting Profession.** *American Journal of Industrial Medicine* 8(1):57-66, 1985.

Proportional mortality ratios (PMRs) of 2,618 white male actors and 838 white female actresses were determined from death records of Actors Equity and Screen Actors Guild (SAG) between 1970 and 1978. Females had an elevated risk for smoking-related cancers compared with U.S. mortality rates. When the proportion of lung cancer in females was analyzed by logistic regression, the relative risk was 3.8 times greater for Equity members than SAG members, indicating that stage actresses have more lung cancer than screen actresses. Although the reason is unexplained, it is suggested that female stage actresses may smoke more than screen actresses. Stage performers are more exposed to asbestos than are screen performers, possibly imposing a synergistic effect in smokers, but no equivalent rise was observed in actors exposed to the same asbestos risk. The study revealed that among males significantly elevated PMRs were found for suicide (1.58), cirrhosis of the liver (1.99), all malignancies (1.15), and cancers of the colon/rectum (1.32), pancreas (1.51), and testes (2.37), compared with female PMRs for suicide (2.02) and lung disease (2.20). No elevations were found for cancers of the breast, ovary, bladder, leukemia, and lymphomas related to increased use of hair dyes or cosmetics by the acting profession.

86–1704. Douglass, C.W.; Gammon, M.D.; Horgan, W.J. **Epidemiology of Oral Cancer.** In: Shklar, G. (Editor). *Oral Cancer: The Diagnosis, Therapy Management and Rehabilitation of the Oral Cancer Patient.* Philadelphia, Saunders, 1984, pp. 72-91.

Tobacco smoking and alcohol consumption have been shown to be associated significantly with the risk of oral cancer, especially in males. When rates were adjusted for one exposure variable, the other usually remained positively associated with oral cancer. The specific relative effect of smoking and alcohol consumption on the risk of oral cancer is obscured by the confounding relationship between the two exposure variables. Additional research is needed to assess types of smoking habits and alcoholic beverages ingested and the critical dose and duration of each. Tobacco chewing habits, and the betel quid chewing habits of India and Sri Lanka, are also associated with an increased risk of oral cancer. Whether cigarette smoking is a cocarcinogen or an additional risk of oral cancer in this area of the world is not clear. Similarly, in the United States, the use of snuff and chewing tobacco has been associated with oral cancer in several retrospective studies. Oral cancer mortality rates are elevated among southern women who engage in frequent snuff-dipping. A case—control study in North Carolina showed a fourfold increase of cancers of the gum and buccal mucosa among rural women who used snuff, compared with nonusers.

86–1705. Ernster, V.L. **Smoking and Lung Cancer: An Overview. Reply 2. (Letter).** *Cancer Research* 46(6):3202-3203, June 1986.

Evidence implicating cigarette smoking as the cause of 75 to 90 percent of lung cancers in the United States comes from a wide variety of sources, including numerous case—control and cohort studies that demonstrate a clear dose—response relationship. Statements on lung cancer mortality for men and women in Britain between 1901 and 1955 (*Cancer Research* 46(6):3200-3201, June 1986), specifically concluding that "any increases that might reasonably be attributed to smoking would have been much too small to be detected against the overwhelming background of synchronous changes," are scientifically irresponsible. On the contrary, this study fully supports the relationship between smoking and the onset of lung cancer in a statistically significant way. A catch-22 is being suggested with regard to acceptable sampling and trial techniques. Although the preferred randomized trials are certainly desirable, it is impossible to attain pure randomness since it would be ethically and logistically impossible to randomly assign people at an early age to smoke or not to smoke over their lifetimes. The two randomized control studies cited against causality of smoking in cancer were too short to support statistically the development of lung tumors as the reasonable result of the smoking habit. Questioning whether the relationship between smoking and lung cancer meets scientific criteria for causality is to continue to beat a dead horse.

86–1706. Filderman, A.E.; Shaw, C.; Matthay, R.A. **Lung Cancer. Part I: Etiology, Pathology, Natural History, Manifestations, and Diagnostic Techniques.** *Investigative Radiology* 21(1):80-90, January 1986.

Current status of lung cancer is reviewed with particular emphasis on passive smoking effects on lung cancer incidence, lung cancer cell type and distribution changes, diagnostic methods, new imaging techniques for staging hilum and mediastinum, and current approaches to therapy. About 80 to 90 percent of bronchogenic carcinomas may be linked directly to active cigarette smoking. The lung cancer risk relative to total cigarette smoke exposure was measured by number of cigarettes smoked, duration of smoking, age at initiation of smoking, depth of inhalation, and tar and nicotine content of cigarettes smoked. Smokers have an estimated tenfold to twentyfivefold greater lung cancer incidence than nonsmokers, but the risk is relatively temporal, declining progressively for 10 to 15 years following smoking cessation, after which it equals that of a lifelong nonsmoker. Sidestream smoke has higher concentrations of carcinogens than mainstream smoke; nonsmokers exposed to environmental smoke may have measurable levels of carbon monoxide or urinary cotinine, indicative of significant smoke inhalation. The weight of evidence since 1981 appears to support an association between passive smoking and development of lung cancer, although many investigators still emphasize the preliminary nature of the data.

86–1707. Hirayama, T. **Nutrition and Cancer. A Large Scale Cohort Study.** *Genetic Toxicology of the Diet* 206:299-311, 1986.

Nutritional intervention may be a more practical and effective means for cancer prevention than "negative intervention," such as discarding undesirable habits (e.g., cigarette smoking), on the basis of results of a large-scale census-population-based prospective cohort study on cancer and other major causes of death in progress in Japan since 1965. Results show that daily intake of green-yellow vegetables reduced the risks of cancer of the lung, larynx, mouth, pharynx, esophagus, stomach, liver, and urinary bladder even when other hazardous habits (e.g., smoking daily, drinking daily, and eating meat daily) were retained. Age-standardized mortality rates (SMR) for lung cancer were lower for smokers who consumed green-yellow vegetables daily than for those who did not. Further, for the daily consumers, SMRs more rapidly approached the level of nonsmokers after smoking cessation. Studies have shown that an improved dietary lifestyle also increases success in smoking cessation at least sixfold. It is concluded that the beneficial effects of daily intake of green-yellow vegetables may be due to inhibition of the cancer promotors abundant in cigarette smoke.

86–1708. Jacobi, W.; Paretzke, H.G. **Risk Assessment for Indoor Exposure to Radon Daughters.** *The Science of the Total Environment* 45:551-562, 1985.

Epidemiological data for natural- and radiation-induced lung cancer rates and their variation with age, sex, and smoking habits were analyzed and results used to estimate excess lung cancer rates from indoor exposure to radiation and corresponding loss of life expectancy. The calculated lifetime lung cancer risk for nonsmokers ranged from 0.3 to 1.5 percent, and appears to be about 10 to 20 times higher in chronic smokers. Women smokers had a lower mortality risk than men smokers. Overall, it is estimated that from 5 to 15 percent of lung cancer deaths are attributed to indoor and outdoor radon exposure, compared with those not exposed to such radiation. The risk is increased by a factor of two for those receiving higher radiation dosages. Approaches to and results for estimating radon health risks are discussed, with particular weight given to derivation of exposure-time-effect relationships using a modified proportional hazard model based on epidemiological data. This analysis indicates that the relative fractions of radiogenic lung cancer rates may be nearly the same for smokers and nonsmokers and for men and women.

86–1709. Kristein, M.M. **Japanese Lung Cancer Mortality Rates, 1947-80 and Per Capita Cigarette Consumption in Japan 5. (Letter).** *International Journal of Epidemiology* 15(1):140-141, March 1986.

Japanese age-adjusted lung cancer mortality rates/100,000 population (male and female) for the years 1947 to 1980 have been correlated with cigarette smoking, measured as number of cigarettes per capita for the population >15 years of age. The best relationship is obtained for a 20-year time lag, which is consistent with well-known dose—response studies. The generalized least squares fitted relationship between lung cancer mortality rates and per capita cigarette smoking in Japan 20 years before is $MR = -2.24 + 0.0061X$, with $R^2 = 0.92$. It can be concluded that, if not for cigarette smoking, lung cancer mortality rates would basically be zero. Levels of lung cancer and per capita smoking are both lower in Japan than in the United States for the period 1940 to 1979, indicating that since cigarette smoking per capita rose substantially in Japan in the 1965 to 1975 period, lung cancer mortality rates in Japan will continue to rise in the near future. Japanese lung cancer mortality rates relative to U.S. rates should also continue to rise (0.14 in 1950, 0.31 in 1960, and 0.37 in 1974). If Japan is reasonably representative of non-Western developing countries in terms of population susceptibility to diseases, results suggest a rising epidemic of lung cancer in many such countries over the next 20 to 40 years.

86–1710. Lee-Feldstein, A. **Cumulative Exposure to Arsenic and Its Relationship to Respiratory Cancer Among Copper Smelter Employees.** *Journal of Occupational Medicine* 28(4):296-302, April 1986.

Smoking habits appear to be independent of cumulative exposure to arsenic, according to respiratory cancer mortality experience (1938 to 1977) of 8,045 white male Montana smelter employees. Their relative exposure to cumulative arsenic trioxide was compared with that of white males of the same region to explore the role of arsenic as a human carcinogen. Exposure to arsenic was estimated in various work areas from industrial hygiene reports of average concentrations present in the smelter. Respiratory cancer mortality was analyzed further by time period of first employment and maximum lifetime exposure to arsenic trioxide. When exposure was estimated with arithmetic means of measured concentrations among men first employed prior to 1925 to 1947, it also increased linearly with increasing cumulative exposure. Although smoking histories were not available for this study, a sample of 1,800 men from this group (82 percent smokers, 16 percent nonsmokers, and 2 percent unknowns) showed that smoking habits of those heavily exposed to arsenic were not significantly different from those of the remainder of the group. Although cumulative exposure to arsenic was not considered, smoking habits were found to be independent of both time-weighted average and ceiling (maximum level) exposures to arsenic. (Auth. Abs. Mod.)

86-1711. Milosevic, M.; Kocijancic, R.; Milosevic, R. **Correlation Between Smoking and Site of Respiratory System Malignant Tumors.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 23-27.

The relationship between smoking and sites for malignant diseases of the respiratory system was examined among Yugoslavians of Paracin. The frequency of carcinoma bronchogenes was nine times, of carcinoma pulmonum four times, and of carcinoma laringis three times greater among smokers than nonsmokers. Malignant tumor incidence was significantly higher among smokers (79.4 percent males and 69.2 percent females) than nonsmokers (20.6 vs. 30.8 percent, respectively). Although women smokers were younger on average, a significantly higher percentage of men were smokers. The prevalence of all malignant tumors was higher among females than males; however, the reverse was found for malignant respiratory tumors: of 76 cases, 63 were found in men, even though women constituted the majority of the population. There was no significant difference in occurrence of malignant tumors among heavy smokers, but the number of people affected increased with the amount smoked. For the entire area (i.e., the middle basin of the rivers Morava, Levca, and Resava), the incidence rate for the population over 20 years was 133/100,000 inhabitants. The rate adjusted for age and sex was somewhat lower (127/100,000) and nearly the same for women and men (128:126).

86-1712. Morris, M.S. **Treatment Failure: The Importance of Context in Treating Head and Neck Cancer. (Letter).** *Archives of Otolaryngology—Head and Neck Surgery* 112(4):454, April 1986.

The focus of Western medicine is on the idealized "quick-fix" treatment. A patient's problem may be hoarseness with an underlying vocal cord cancer; the quick-fix solution might be laryngeal surgery or radiation therapy, with no acknowledgment of the context in which these biologic problems occur: the patient, the patient's family, and the social context of the patient outside the family. Concomitant aberrations in the patient's behavior or lifestyle may need addressing to treat the problem effectively. It is well accepted that heavy tobacco use, and possibly substantial alcohol use, predisposes an individual to the development of aerodigestive tract malignancy. Both of these habits are associated with complex behavioral and emotional issues, factors extending well beyond the biologic dimensions of squamous cell carcinoma. To treat successfully the patient with aerodigestive tract cancer, concerted effort must be applied to eradicate associated behavioral influences that can affect the biologic disease as well as the disease itself. The patient must be persuaded to stop the use of tobacco, alcohol, or both, because continuation may lead to recurrent or persistent disease. Failure to address the context surrounding the head and neck cancer will ultimately lead to treatment failure in the biologic sense.

86-1713. Osorio, A.M.; Bernstein, L.; Garabrant, D.H., et al. **Investigation of Lung Cancer Among Female Cosmetologists.** *Journal of Occupational Medicine* 28(4):291-295, April 1986.

A higher frequency of smoking was suggested as the probable cause for elevated lung cancer risk among female cosmetologists. A case—control study found no associations between lung cancer and specific beauty shop tasks, beauty product use, or environmental exposures in crude analyses or with smoking status controlled. Case subjects had held more jobs outside cosmetology than control subjects, but these jobs did not appear to be associated with any known hazardous exposures. The study used a Los Angeles County population-based cancer registry to identify subjects and administered a standardized questionnaire to proxy informants for deceased lung cancer patients and nonpulmonary cancer control patients. The only two variables that demonstrated statistically significant increased odds ratios were smoking and jobs outside employment as a beautician. Outside occupations included potential hazards in both the case and control subjects, but lack of sufficient detail about these workplaces prevented any further interpretation. (Auth. Abs. Mod.)

86-1714. Pathak, D.R.; Samet, J.M.; Humble, C.G., et al. **Determinants of Lung Cancer Risk in Cigarette Smokers in New Mexico.** *Journal of the National Cancer Institute* 76(4):597-604, April 1986.

Specific smoking practices, i.e., amount smoked, duration of smoking, cigarette type, and smoking cessation, were examined as determinants of lung cancer risk in a population-based, case—control study of 1,290 New Mexicans (521 cases) matched for age, sex, and ethnicity. Among current smokers, risk increased with each additional cigarette smoked/day ($p<0.001$). The risk per year smoked by persons ≥ 65 years was only one-third that of those <65 years. A somewhat higher risk was found associated with smoking nonfilter cigarettes, but there was no evidence of decreasing risk as the extent of filter smoking increased. Lifelong filter cigarette smokers and smokers of both filter and nonfilter cigarettes were at lower risk than lifelong smokers of only nonfilter cigarettes. In ex-smokers, the pattern of variation of relative risk with amount and duration was similar to that in current smokers. Excluding those who had stopped for ≤ 1 year, the relative risk declined exponentially with duration of smoking cessation ($p < 0.01$). Analyses confirm strong benefits deriving from cessation of smoking and indicate possible reduction of lung cancer risk from smoking filter cigarettes. (Auth. Abs. Mod.)

86–1715. Prener, A.; Jensen, O.M. **Lungecancer og Cigarettjaere i Danmark. [Cancer of the Lung and Cigarette Tar in Denmark.]** *Ugeskrift For Laeger* 147(51):4221-4227, December 16, 1985, Danish.

Lung cancer incidence has decreased at a lesser rate in Denmark than in other developed countries since 1950, and the slowed decline is attributed to the high-tar content of cigarettes smoked. On the basis of statistical information from the Danish Cancer Registry for the period 1943 to 1977 and a preview of the 1978 to 1982 period, the risk of developing lung cancer is increasing among Danish women, while disease incidence among men has stabilized, particularly among younger age groups outside the Copenhagen area. The tar content of cigarettes in Denmark is high compared with that of other countries, and although cigarette consumption appears to have leveled, the number of women who smoke has increased. It is suggested that the decline since 1950 in incidence of lung cancer in a number of western countries, including Britain, is the result of a decrease in the average tar content/cigarette, while the lack of a significant decrease in lung cancer incidence in Denmark is related to the lack of change in high-tar content/cigarette smoked by Danes.

86–1716. Pruess-Schwartz, D.; Baird, W.M.; Nikbakht, A., et al. **Benzo(*a*)pyrene:DNA Adduct Formation in Normal Human Mammary Epithelial Cell Cultures and the Human Mammary Carcinoma T47D Cell Line.** *Cancer Research* 46(6):2697-2702, June 1986.

The similarity of benzo(*a*)pyrene:deoxyribonucleoside (BaP:DNA) adduct profiles in normal mammary epithelial cells and human mammary carcinoma T47D cell line suggests that the latter is an excellent model for studies on the metabolic activation of polycyclic aromatic hydrocarbons to DNA binding intermediates in human mammary cells. This study provides the first evidence, other than cochromatography, that(—)-7β,8α-dihydroxy-9α,10α-epoxy-7,8,9,10-tetrahydroBaP (*anti*-BaPDE) is formed in cell systems and reacts with DNA in cells to form (—)-*anti*-BaPDE:deoxyguanosine (*anti*-BaPDE:dGuo). Isolation of individual BaP:DNA adducts followed by acid hydrolysis allowed identification of BaP:DNA adducts formed in human mammary cell cultures and demonstrated presence of (—)-*anti*-BaPDE:dGuo. Exposure of human mammary epithelial and carcinoma T47D cell cultures to (^{3}H)BaP for 24 hours caused binding levels of 81 and 182 pmol of BaP per milligram of DNA in each of the cultures, respectively. Analysis of BaP:DNA adducts resolved by immobilized boronate chromatography and reverse-phase high-performance liquid chromatography demonstrated the presence of three BaP:DNA adducts in both types of mammary cells: M2, MS1, and MS2 in a ratio of 1.6:1:14. (Auth. Abs. Mod.)

86–1717. Reif, A.E. **Susceptibility to Carcinogenesis.** *Cancer* 57(12):2408-2418, June 15, 1986.

Qualitative and quantitative evidence is examined that spontaneous incidence of a specific type of tumor is one of many factors that determine the incidence of carcinogen-induced tumors (e.g., tobacco-related) of the same type. To avoid selection bias in the choice of data for analysis, all suitable data used in a previous review on a closely related subject were analyzed. One approach consisted of mathematical elimination of factors influencing carcinogenesis other than spontaneous incidence. When unselected carcinogenesis data were examined without such elimination, spontaneous incidence often had no apparent effect on induced incidence. It appears that spontaneous incidence is a weak factor that is frequently outweighed by other factors such as the mode of carcinogen activation and metabolism. Although the evidence was consistent with this conclusion, it does not constitute proof. Regarding mechanism, a carcinogen is seen to enhance potential for conversion of normal progenitor cells into cancer cells, which underlies spontaneous incidence of tumors. It follows that carcinogen assays should be most sensitive when the type of tumor induced by the carcinogen has a spontaneous incidence that is overt but low, or is just barely subthreshold. (Auth. Abs. Mod.)

86–1718. Saracci, R. **Beryllium: Epidemiological Evidence.** *IARC Scientific Publications* 65:203-219, 1985.

A review of epidemiological evidence on the relationship between exposure to beryllium (Be) and cancer occurrence in man determined that (1) available evidence from several studies concerns only two U.S. working populations and a registry of clinical cases covering these same populations; (2) data suggest an association between lung cancer occurrence and Be-related occupations; and (3) the cancer association appears to be limited to lung cancer. On the basis of a comparison of the smoking habits of Be workers and those among the general population, the increase in lung cancer risk cannot be accounted for by smoking alone. It is concluded that the most likely single explanation of published epidemiological data is that Be is carcinogenic, but that the data are inadequate to define a dose—response relationship or possible differential effects of different compounds. Total evidence is interpreted as (1) beryllium is the cause of excess cancer mortality in these groups of employees; and (2) beryllium contributes to the development of some cancers in man. It is suggested that cohorts of workers exposed to beryllium in the United States continue to be monitored.

86–1719. Staehelin, H.B.; Roesel, F.; Buess, E., et al. **Dietary Risk Factors for Cancer in the Basel Study.** *Bibliotheca Nutritio et Dieta* 37:144-153, 1986.

The Basel (Switzerland) cancer studies support the concept of a protective effect of vitamin A, β-carotene, and ascorbic acid in cancer of the lung and probably stomach. The Basel Study, initiated in 1960, was originally based on clinical and laboratory data pertinent to cardiovascular diseases in 6,400 men and women. A second examination performed in 1965 to 1966 (BSII) of 4,224 men included a prospective evaluation of the role of vitamins in carcinogenesis, and a third examination (BSIII) between 1971 and 1973 reexamined 3,756 men and 711 women for plasma vitamins. A complete vitamin analysis was conducted, including data on eating habits and tobacco and alcohol consumption. Smoking assessed in BSII was significantly more prevalent in individuals with lung cancer ($p<0.001$), stomach cancer ($p<0.005$), and cancer of the large bowel ($p<0.005$). Differences were less marked when data from BSIII were considered. Alcohol consumption was also more prevalent in cancer cases ($p<0.02$).

86–1720. Thomas, D.C.; McNeill, K.G.; Dougherty, C. **Estimates of Lifetime Lung Cancer Risks Resulting From Rn Progeny Exposure.** *Health Physics* 49(5):825-846, November 1985.

Data from various sources on five mining communities (in Colorado, Czechoslovakia, Newfoundland, Sweden, and Ontario) were analyzed to estimate the lifetime risk of lung cancer resulting from radon exposure, along with the interactions between radiation and other factors such as smoking and age at exposure. Summarized data indicate that risks from radon progeny interacted with age and smoking in a form intermediate between additive and multiplicative. Never, former, and light (<20 cigarettes/day) and moderate and heavy (>20 cigarettes/day) smoking and radiation exposure categories are tabulated; risks are expressed relative to the lowest category of each factor. It is concluded that exposure-response relations can in most cases be adequately described by a linear model. Using a relative risk model, the effects of radon progeny interact more nearly multiplicatively with both age at risk and smoking. Risks show a strong variation with time since exposure, but the exact form depends on how latent periods vary with cumulative dose or dose rate. Best estimates of lifetime risk are 130 excess lung cancers/1,000 persons exposed to 4 working level months/year at active breathing rates from age 15 to 64, and 20 excess lung cancers/1,000 exposed to 0.02 working level above normal background levels at quiescent breathing rates for an entire lifetime. It is recommended that regulations setting permissible annual exposures be supplemented by additional explicit requirements that average exposures to all relevant (i.e., potentially exposed) workers in a company be lowered.

86–1721. Wang, H.H.; Antonioli, D.A.; Goldman, H. **Comparative Features of Esophageal and Gastric Adenocarcinomas: Recent Changes in Type and Frequency.** *Human Pathology* 17(5):482-487, May 1986.

The high risk of esophageal squamous carcinoma among smokers and alcohol users was confirmed in a review of 160 consecutive cases of esophageal and gastric carcinoma to evaluate the impression of recent changes in their types and characteristics. Both smoking and alcohol use appeared to confer a slightly, but not significantly, increased risk for proximal adenocarcinomas. Patients (98 men) averaged 68 years of age (33 to 95 years). Esophageal adenocarcinomas accounted for 34 percent of all esophageal cancers and 60 percent of tumors confined to the lower third of the esophagus. All but one were associated with Barrett's epithelium. Among the gastric cancers, previous observations of an increased prevalence of neoplasms confined to the cardia were extended. Proximal adenocarcinomas (arising from the esophagus, gastroesophageal junction, and cardia) constituted 34 percent of all adenocarcinomas in this series and appeared to be a distinctive group with common features. Compared with other gastric cancers, the proximal carcinomas were associated with greater incidence of smoking and alcohol use, a lower mean age (65 years), higher male-to-female ratio (3.3:1), greater frequency of hiatal hernia (40 percent), and lower prevalence of tumors composed predominantly of signet ring cells. It is suggested that proximal adenocarcinomas may form a specific category etiologically different from distal gastric cancers. (Auth. Abs. Mod.)

86–1722. Wigle, D.T.; Mao, Y.; Semenciw, R., et al. **Cancer Patterns in Canada.** *Canadian Medical Association Journal* 134(3):231-235, February 1, 1986.

Lung cancer will likely displace breast cancer as the leading cancer killer of Canadian women by 1990. Nearly 50 percent of all Canadian women smoke. Lung cancer alone accounts for most of the recent increase in cancer mortality among Canadian women. Had smoking been controlled more than 20 years ago when its role as the main cause of lung cancer was already established, cancer mortality rates would be decreasing among women and increasing less rapidly among men today. Although the overall prevalence of smoking and per capita consumption of tobacco have declined in Canada during recent years, 46 percent of females and 44 percent of males 15 to 24 years old smoke cigarettes. Cancer is diagnosed in about 70,000 Canadians each year and is the leading cause among women of loss of potential years of life before age 75. Life-threatening forms of cancer will develop in at least one of every three newborns during their lifetimes. Compared with other countries, Canada has high rates for certain smoking-related cancers (lung, mouth, throat), leukemia, cancers of the colon and breast, and lymphatic disease. Lung cancer mortality is highest in Quebec, the province with the highest prevalence of smoking. In Canada, overall rates of death from cancer among men increased by 32 percent from 1951 to 1983. Among women, mortality rates declined by 12 percent from 1951 to

1976, and increased from 1976 to 1983, particularly among the 55 to 74 age group.

86–1723. World Health Organization. **Tobacco Smoking.** International Agency for Research on Cancer Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans, Volume 38. IARC Working Group, February 12-20, 1985, Lyon, France. Geneva, World Health Organization, 1986, 421 pp.

Sufficient evidence exists that (1) tobacco smoke inhalation or the topical application of tobacco smoke condensate causes cancer in experimental animals; (2) tobacco smoke is carcinogenic to humans; (3) tobacco use (i.e., cigarettes, cigars, pipes, and bidis) is causally related to the occurrence of malignant tumors of the respiratory and upper digestive tracts; and (4) cigarette smoking is causally related to the occurrence of malignant tumors of the bladder, renal pelvis, and pancreas. Among other conclusions of the International Agency for Research on Cancer (IARC) Working Group are that (1) smokers of "low-tar" cigarettes tend to compensate for lower yields of nicotine and possibly other smoke components by changing their manner of smoking, but generally do not compensate fully for lower tar yields; (2) case—control and cohort studies suggest that prolonged use of nonfilter and "high-tar" cigarettes is associated with greater lung cancer risks than prolonged use of filter and "low-tar" cigarettes; (3) tobacco smoke in its three forms (i.e., mainstream, sidestream, and environmental) contains chemicals that are both carcinogenic and mutagenic; and (4) passive smoking gives rise to some risk of cancer, on the basis of knowledge of the nature of sidestream and mainstream smoke, of the materials absorbed during passive smoking, and of the quantitative relationships between dose and effect that are commonly observed from exposure to carcinogens.

86–1724. Wynder, E.L.; Dieck, G.S.; Hall, N.E.L., et al. **A Case—Control Study of Diesel Exhaust Exposure and Bladder Cancer.** *Environmental Research* 37(2):475-489, 1985.

Bladder cancer cases were significantly more likely to be current cigarette smokers than were controls in a hospital-based case—control study of the disease in workers occupationally exposed to diesel exhaust. The study population comprised 776 men (194 cases), 20 to 80 years old, from 18 hospitals in six U.S. cities from January 1981 to May 1983. Parameters examined included occupation, smoking history, alcohol and coffee consumption, and various demographic variables. Twenty-two percent of bladder cancer patients compared with 12 percent of controls smoked 1 to 20 cigarettes/day, while 25 percent ($n = 49$) compared with 14 percent smoked ≥ 21 cigarettes/day. No difference was found in the proportion of bladder cancer cases in employees exposed to diesel exhaust compared with other occupations. This relationship did not change after the smoking variable was controlled. Study subjects occupationally exposed to diesel exhaust were warehousemen, materials handlers, bus or truck drivers, railroad workers, and heavy equipment operators and mechanics. (Auth. Abs. Mod.)

86–1725. Yoshino, K.; Sato, T.; Miyahara, H., et al. **Squamous Metaplasia of the Supraglottic Region With Reference to Smoking Habits.** In: Myers, E.N. (Editor). *New Dimensions in Otorhinolaryngology. Head and Neck Surgery*, Proceedings of the XIIIth World Congress, Miami Beach, Florida, May 26-31, 1985, International Congress Series No. 680. The Netherlands, Elsevier Science Publishers (Biomedical Division), 1985, pp. 722-723.

Carcinoma arising in the supraglottic region of the larynx is almost always squamous cell type, although covered by ciliated pseudocolumnar epithelium (respiratory epithelium). Cigarette smoking is considered a possible risk factor for potential malignant transformation. To study the extent of squamous metaplasia of the supraglottic region and its relation to cigarette smoking, larynges obtained at autopsy or surgery from 37 subjects (24 males) without and 97 (90 males) with carcinoma were examined. A total of 116 smokers were identified. Of 19 smokers' specimens of larynges without carcinoma, 8 (42 percent) showed type III metaplasia (classification chart included), but not type IV or V, suggesting that squamous metaplasia is progressed by aging to type II, and by addition of smoking, to type III. All larynges with carcinoma were from smokers with 67 percent of supraglottis showing type V metaplasia. In contrast, 59 percent of glottis showed type III metaplasia. Brinkman Index of type V was significantly higher than that of type III ($p < 0.001$). Results suggest that highly advanced squamous metaplasia of the supraglottic region precedes supraglottic carcinoma and excessive smoking accelerates metaplasia (squamous metaplasia as digestive tract) and malignancy. (Auth. Abs. Mod.)

86–1726. Zagraniski, R.T.; Kelsey, J.L.; Walter, S.D. **Occupational Risk Factors for Laryngeal Carcinoma: Connecticut, 1975-1980.** *American Journal of Epidemiology* 124(1):67-76, July 1986.

Tobacco smoking and alcohol consumption were positively associated with occupational risk for laryngeal cancer in a case—control study. Cases comprised 92 59-year-old white males, diagnosed between 1975 and 1980 and employed in the manufacture of rubber products or transportation equipment other than shipbuilding, or as machinists, bartenders, farmers, masons, and metal grinders; 94.6 percent were smokers. The 181 hospital controls were individually matched for age, year and hospital of admission, county of residence, smoking status (current vs. ex-smokers), and type of tobacco used at time of admission. Cases smoked more cigarettes/day (2.0 vs. 1.7 packs/day) and for longer periods (39.9 vs. 37.2 years) than controls; alcohol consumption was also higher for cases. The data indicated that combined effects of tobacco and alcohol were more than additive, but less than multiplicative. With effects of tobacco and alcohol controlled in a conditional linear logistic model, elevated odds ratios were found for all occupations. Only machinists had a statistically significant odds ratio (2.5, 95 percent confidence interval = 1.2 to 5.2) in the multivariate analyses. Asbestos and nickel were not found to be risk factors for laryngeal cancer. (Auth. Abs. Mod.)

86–1727. Zemla, B.; Wojcieszek, Z.; Banasik, R. **Ryzyko Wzgledne Raka Krtani w Stacjonarnej i Migrujacej Populacji Mezczyzn w Zaleznosci od Palenia Tytoniu. [Relative Risk of Laryngeal Carcinoma in Stationary and Migrating Male Populations in Relation to Tobacco Smoking.]** *Otolaryngologia Polska* 39(4):294-300, 1985, Polish.

Laryngeal carcinoma was significantly correlated with smoking (filter and nonfilter cigarette, pipe, and cigar) among 272 males in Poland compared with 739 control males. The relative risk of laryngeal carcinoma in males born in Upper Silesia (65.4 percent cases vs. 54.3 percent controls) was compared with that of males who migrated to Upper Silesia between 1948 and 1952 (34.6 percent cases vs. 45.7 percent controls). The smoking risk was significant in both populations. Of 178 natives, 94.9 percent smoked, compared with 96.8 percent of 94 immigrants. With relative risk (RR) of 1.0 for nonsmokers, RR for moderate smokers (15 to 20 cigarettes/day) of unfiltered cigarettes was 19.7 for natives vs. 8.25 for immigrants; RR was 13.2 for natives smoking filter cigarettes. Data on ex-smokers in the same smoking category show a RR of 2.7 for natives compared with 3.3 for immigrants. It is suggested that evaluating the laryngeal carcinoma risk in populations segregated according to birth places may be valuable for integrating environmental aspects of epidemiological studies into incidence of laryngeal carcinoma.

See also, **86–1749, 86–1782, 86–1896**

NON—NEOPLASTIC RESPIRATORY DISEASES

86–1728. Anthonisen, N.R.; Wright, E.C.; IPPB Trial Group. **Bronchodilator Response in Chronic Obstructive Pulmonary Disease.** *American Review of Respiratory Disease* 133(5):814-819, May 1986.

Bronchodilator response to 250 μg isoproterenol in 985 patients with chronic obstructive pulmonary disease (COPD) was positively related to symptomatic wheezing and exercise capacity, but negatively to smoking history. Nearly all (96.5 percent) had a smoking history; average cigarette consumption exceeded 50 pack-years. Heavy smokers tended to have reduced responses; this relationship held even when patients with less than 20 pack-years were excluded. It is suggested that airways reactivity and smoking history may be separate risk factors in the development of COPD; conversely, heavy smoking may reduce bronchodilator response. Though smoking history had a significant effect on both absolute (percent increase in FEV_1) and relative (change in FEV_1 as a percent of predicted normal) bronchodilator responses, it accounted for little of the observed variation. Patients with large relative and absolute responses had increased variability of FEV_1 with time and a decreased annual rate of decline of FEV_1.

86–1729. Bhaskar, K.R.; O'Sullivan, D.D.; Seltzer, J., et al. **Density Gradient Study of Bronchial Mucus Aspirates From Healthy Volunteers (Smokers and Nonsmokers) and From Patients With Tracheostomy.** *Experimental Lung Research* 9(3-4):289-308, 1985.

Mucus aspirated from six normal volunteers (one light smoker, 10 cigarettes/day for 1 year; two heavy smokers, 20 cigarettes/day for ≤20 years) was compared with that from four patients (one ex-smoker) with tracheostomy as a result of respiratory muscle paralysis from neurological disease. Normal aspirates contained small threads of mucus, while tracheostomy aspirates had viscous blobs of jelly, a difference in physical appearance reflected in macromolecular yields, 0.3 to 1 mg/mL and 6 to 24 mg/mL, respectively. On analytical ultracentrifugation, normal mucus showed no discernible material in the buoyant density region typical of epithelial glycoprotein (1.5 g/mL). Virtually all the material migrated to the miniscus and contained predominantly lipids and proteins. A trace amount of material recovered from a higher density region (≥1.6 g/mL) was found to contain both glycoprotein and proteoglycan. Aspirates from heavy smokers contained appreciable amounts of material with typical buoyant density but with features of proteoglycan. In tracheostomy aspirates, epithelial glycoprotein of typical buoyant density and chemical composition accounted for up to 25 percent of nondialyzable material. It is concluded that under normal conditions typical epithelial glycoprotein is virtually absent from airway mucus and that the glycoconjugate present has features of glycoprotein and proteoglycan. (Auth. Abs. Mod.)

86–1730. Bosisio, E.; Scoccimarro, A.; Rizzi, M., et al. **Mean Transit Time, Forced Expiratory Volume and Age in Healthy Male Smokers and Non-Smokers.** *Respiration* 49(1):23-26, 1986.

Smokers show abnormalities in ventilatory function more frequently than nonsmokers. Mean transit time (MTT) and its correlation with age and forced expiratory volume (FEV) were studied in 67 healthy young males, aged 20 to 30 years, with no signs of cardiopulmonary disease. Cigarette consumption among the 38 smokers averaged 14.6 pack years and 5 to 15 years smoking duration. FEV, FEV in 1 second (FEV$_1$), and peak flow in smokers were significantly lower than in nonsmokers ($p<0.05$, 0.025, 0.05, respectively); FEV$_1$/FEV ratio, flows, and MTT were comparable. MTT appeared directly related to age and negatively to FEV$_1$/FEV, with no difference between the two groups, but MTT was directly related to FEV in nonsmokers and negatively in smokers. Multiple regression analysis, $MTT=a+b(FEV)=c(age)$, showed that intercept and slope varied significantly between smokers and nonsmokers, with slope negative in the former. In nonsmokers, the effects of age and FEV on MTT were similar, but in smokers MTT was most influenced by age, probably because MTT measured the effects of continued smoking. (Auth. Abs. Mod.)

86–1731. Braude, S.; Nolop, K.B.; Hughes, J.M.B., et al. **Comparison of Lung Vascular and Epithelial Permeability Indices in the Adult Respiratory Distress Syndrome.** *American Review of Respiratory Disease* 133(6):1002-1005, June 1986.

Measurements of pulmonary clearance of inhaled ^{99m}Tc-diethylene triamine pentacetate (DTPA) and transvascular ^{113m}In-transferrin flux were made in 12 nonsmoking patients with established adult respiratory distress syndrome (ARDS), and in seven smoker and seven nonsmoker controls. Smokers had significantly increased ^{99m}Tc-DTPA pulmonary clearance (clearance rate constant, 3.6 ± 0.8; mean ± SEM), compared with nonsmokers (1.2 ± 0.1). All patients with ARDS had increased clearance of ^{99m}Tc-DTPA (5.2 ± 0.9), but the finding was nonspecific in that clearance overlapped with findings in normal smokers. Protein flux in smokers (protein flux units, 0.0 ± 0.2) was similar to that in nonsmokers (0.3 ± 0.2). In 9 of 12 patients with ARDS, protein flux was increased, and as a group (3.2 ± 1.0) they differed significantly ($p<0.01$) from the combined smokers and nonsmokers in the control group (0.2 ± 0.1). The parameters of DTPA clearance and transvascular protein flux correlated well in the patients with ARDS (Spearman's rank correlation = 0.71, $p<0.01$). Although ^{99m}Tc-DTPA clearance is a sensitive technique in ARDS, no diagnostic conclusions can be made. Abnormal protein flux appears to be more specific for ARDS, but was not a universal finding in patients studied. (Auth. Abs. Mod.)

86–1732. Costabel, U.; Bross, K.J.; Andreesen, R., et al. **HLA-DR Antigens on Human Macrophages From Bronchoalveolar Lavage Fluid.** *Thorax* 41(4):261-265, April 1986.

Smoking did not appear to influence expression of HLA-DR (Ia-like) antigens on human macrophages in analyses of cells from bronchoalveolar lavage fluid obtained from 12 normal smokers (average consumption 14 pack-years), 12 patients with pulmonary sarcoidosis, 6 patients with extrinsic allergic alveolitis, 9 patients with cryptogenic fibrosing alveolitis, and 11 normal nonsmokers. No differences in macrophage DR expression were found between the five groups. The HLA-DR antigen was demonstrated by the mouse monoclonal antibody OKIa using a peroxidase-antiperoxidase method performed on glass slides. OKIa positivity was observed on virtually all macrophages; mean (SD) values for the different groups were 98.6 percent (2.3 percent) for normal nonsmokers, 97.9 percent (2.2 percent) for normal smokers, 98.6 percent (2.3 percent) for sarcoidosis patients, 97.5 percent (2.9 percent) for extrinsic allergic alveolitis patients, and 99.6 percent (1.3 percent) for cryptogenic fibrosing alveolitis patients. Results differ from those of other studies reporting that smoking decreases DR antigen expression on human alveolar macrophages. It is suggested that the discrepancy might be attributed to use of an immunofluorescent technique that may have interfered with interpretation of specific fluorescence of surface markers; smokers' macrophages are known to show autofluorescence. These observations suggest that previously reported enhanced antigen presentation by alveolar macrophages in sarcoidosis is not linked with an increase in the percentage of DR$^+$ macrophages in the lung. (Auth. Abs. Mod.)

86–1733. Dodge, R.; Cline, M.G.; Burrows, B. **Comparisons of Asthma, Emphysema, and Chronic Bronchitis Diagnoses in a General Population Sample.** *American Review of Respiratory Disease* 133(6):981-986, June 1986.

Physician diagnostic bias may result in labeling male patients as emphysematous and female patients as asthmatic or bronchitic. Of 351 subjects who received a new diagnosis of asthma, emphysema, or chronic bronchitis from community physicians in an analysis of diagnoses over 8 years in one community, 44.5 percent had a prior or concomitant diagnosis of another obstructive disease. Asthma developed most often in young patients, emphysema in older patients, and chronic bronchitis occurred in all age groups. Among older subjects, disease groups were surprisingly similar, with wheeze, dyspnea, and attacks of shortness of breath with wheeze all occurring frequently in diagnosed subjects, including those with emphysema. A majority of patients who developed emphysema were males; in contrast, 72.8 percent of asthma and chronic bronchitis patients were females. Smoking was prevalent in all diagnosed groups; 64.7 percent of patients diagnosed with new asthma had a history of cigarette smoking, compared with 82.5 percent in patients diagnosed with emphysema. Adjusted for sex differences, the smoking rates were as high in those with new asthma as in those with emphysema. Among older males with new dyspnea and a history of smoking, 24.4 percent were labeled as having emphysema, compared with 5.4 percent of comparable females. Data suggest that physicians tend to diagnose emphysema in elderly males regardless of the nature of their airways symptoms.

86–1734. Finn, J.P.; Myers, M.J.; Nair, K.M., et al. **Clinical Comparison of a New Technetium 99m DTPA Aerosol Delivery System With Krypton 81m.** *British Journal of Radiology* 59(697):19-24, January 1986.

A new ^{99}Tc^m DTPA aerosol delivery system with steady state ^{81}Kr^m gas, evaluated in diagnosis of pulmonary embolic disease, proved to be less effective in providing accurate clinical information for smokers than in other cases. Forty patients (fifteen smokers) had aerosol and ^{81}Kr^{m} ventilation imaging followed by perfusion scintigraphy. The combined aerosol/perfusion images were compared with ^{81}Kr^{m}/perfusion images for diagnostic equivalence. Aerosol image quality was also compared directly with ^{81}Kr^{m}. Three-quarters of the patients who had segmental ventilation-perfusion (V/Q) mismatch on ^{81}Kr^{m}/perfusion images also had mismatch on aerosol/perfusion images. Of those who had no mismatch on Kr/perfusion images, it was possible to rule out mismatch on aerosol/perfusion images in 80 percent of cases. Fifteen percent of aerosol images were uninterpretable as a result of excess deposition in large airways, a problem more frequent in smokers than in nonsmokers ($p < 0.005$). The average delivery efficiency of the system was 2 percent, in terms of proportion of loaded activity retained in the lungs. (Auth. Abs. Mod.)

86–1735. Kerigan, A.T.; Goldsmith, C.H.; Pengelly, L.D. **A Three-Year Cohort Study of the Role of Environmental Factors in the Respiratory Health of Children in Hamilton, Ontario. Epidemiologic Survey Design, Methods, and Description of Cohort.** *American Review of Respiratory Disease* 133(6):987-993, June 1986.

A 3-year cohort analytic study of the relative importance of outdoor environmental factors (e.g., suspended particulates, sulfur dioxide) and indoor environmental factors (e.g., parental smoking, gas cooking) on the respiratory health of children within a single city is described. There were 3,345 children 7 to 10 years of age studied the first year, 3,727 the second year, and 3,168 the third year; response rates were 95.4, 75.6, and 75.6 percent, respectively. Respiratory symptoms and indoor environmental factors were determined by interview and questionnaire. Pulmonary function measures included both the forced expiratory maneuver and the single- and multiple-breath nitrogen washouts. Outdoor air quality was measured by a comprehensive network of suspended particulate and sulfur dioxide monitors. The repeatability of both the questionnaire and pulmonary function data was acceptable except for variables derived from the single-breath nitrogen washout (correlation between initial and repeat closing volume vital capacity was 0.14). Cigarette smoking was reported in 4.8 percent of the children in the third year. Distribution of other covariables was not uniform, and prevalence of parental smoking and gas cooking was greatest in the industrial area with the highest particulate pollution. (Auth. Abs. Mod.)

86–1736. Khoury, M.J.; Beaty, T.H.; Newill, C.A., et al. **Genetic-Environmental Interactions in Chronic Airways Obstruction.** *International Journal of Epidemiology* 15(1):65-72, March 1986.

Patterns of interaction between cigarette smoking and genetic factors relating to airways obstruction (AO) were analyzed from cross-sectional data on 1,787 white, nonpatient adults. AO was defined as 1-second forced expiratory volume (FEV_1) less than 68 percent of forced vital capacity (FVC). Interaction was examined between smoking and each of four factors previously found to be related to AO: alpha-1 antitrypsin (PiZ allele), ABO blood groups (A antigen), ABH nonsecretor status, and first degree relationship to a chronic obstruction pulmonary disease or lung cancer patient. Multiple linear regression was used to test for interaction and adjust mean FEV_1 (as a percent of FVC) and prevalence of AO for age, sex, socioeconomic status, and coffee and alcohol intake. Statistical interaction was observed between smoking (measured in pack-years) and two genetic factors (presence of blood A antigen and the family history). At higher pack-year levels, those individuals with the A antigen or the family history, and especially those with both factors, had a much lower mean FEV_1/FVC percent and a much higher prevalence of AO than anticipated from a simple additive model. There was no interaction between smoking and PiZ allele or smoking and ABH secretor status. Findings suggest a possible biological interaction between cigarette smoke and the airways of individuals with blood group A antigen and familial lung disease, and also emphasize the role of genetic-environmental interactions in chronic diseases of multifactorial etiology. (Auth. Abs. Mod.)

86–1737. Lawton, R.W.; Ross, M.R.; Feingold, J. **Spirometric Findings in Capacitor Workers Occupationally Exposed to Polychlorinated Biphenyls (PCBs).** *Journal of Occupational Medicine* 28(6):453-456, June 1986.

Smoking was correlated with reduced forced expiratory volume at 1 second (FEV_1) values in a population of capacitor workers occupationally exposed to polychlorinated biphenyls (PCBs). The population of 194 workers (152 males) was selected in 1976 during active PCB use and followed up in 1979, 1981, and 1983 after the PCB ban. Subjects were predominantly heavy smokers (71.4 percent males, 54.2 percent females) averaging a pack/day for 18-20 years. Obstructive impairment was found in 15 percent of the 1979 and 1983 populations, mostly smokers and ex-smokers. A history of respiratory illness or symptomatology and reduced FEV_1/forced vital capacity (FVC) was correlated with PCB exposure and serum PCB levels in females in 1976, but not in males. Seven cases of clinically recognized emphysema and 12 cases of chronic bronchitis were found in 1976. Past histories of significant pulmonary infections were reported in 16 cases. Chronic upper respiratory tract infections and allergies were prevalent. Four workers (heavy smokers) reported leukoplakia and/or laryngeal polyps. Emphysema was suspected in six cases. Predominant findings were evidence of past pulmonary infection (granulomata, calcifications, scarring). A malignant coin lesion was discovered in one worker. Evidence of fibrosis was found in two workers. Mean 1979 serum PCB levels were elevated 35 to 40 times the normal background community levels in humans.

86–1738. Lyons, D.J.; Howard, S.V.; Milledge, J.S., et al. **Contribution of Ethanol and Cigarette Smoking to Pulmonary Dysfunction in Chronic Alcoholics.** *Thorax* 41(3):197-202, March 1986.

The high prevalence of respiratory disease in alcoholics is largely attributable to smoking habits, according to a study of pulmonary dysfunction in 27 patients treated for problems relating to chronic alcoholism. No evidence of a specific pulmonary toxic effect of ethanol was identified in the study. A case—control study of alcoholics and matched controls showed no significant difference in pulmonary function between the two groups. Fourteen alcoholics admitted to one or more respiratory symptoms (i.e., six had coughs, four complained of wheeze, three were dyspneic on mild exertion, and eight had cough, wheeze, dyspnea on mild exertion, and excessive sputum production). Of patients with symptoms, nine were smokers, four were current nonsmokers, and one had never smoked. The group with symptoms consisted of four smokers, six current nonsmokers, and three never smokers. Alcoholics who were ex-smokers had a group mean (SD) of 19.5 (13) pack-years history of cigarette smoking before stopping, compared with 29.8 (14) for the alcoholic group as a whole. Pulmonary function was abnormal in 13 of the 27 alcoholics and in 15 of the control group. When the 13 alcoholic smokers were compared with the 14 current nonsmokers in pulmonary function and never smokers, no significant differences between the two groups were found except for residual volume, which was significantly greater in alcoholic smokers, both absolutely and in terms of percentage of predicted normal values ($p<0.01$). (Auth. Abs. Mod.)

86–1739. Manfreda, J.; Holford-Strevens, V.; Cheang, M., et al. **Acute Symptoms Following Exposure to Grain Dust in Farming.** *Environmental Health Perspectives* 66:73-80, April 1986.

Smoking was associated with cough on exposure to grain dust in current farmers of both sexes and with shortness of breath in male current farmers. Of 661 male and 535 female current and former farmers tested, 60 and 25 percent, respectively, reported at least one acute symptom on exposure to grain dust. Association of cough, wheezing, shortness of breath, and stuffy nose with skin reactivity and capacity to form IgE is consistent with the allergic nature of these symptoms. Barley and oats dust were perceived as dust most often producing symptoms. Grain fever showed different symptoms; it was associated with neither skin reactivity nor total IgE. It is suggested that smoking might increase an individual's susceptibility to dust exposure reactions. Only those who reported wheezing on exposure to grain dust may have an increased risk to develop chronic airflow obstruction. In former male farmers, the history of stuffy nose was associated with nonsmoking. Similarly, both current and former farmers who had experienced grain fever were more likely to never have smoked, but this was significant only when data were pooled.

86–1740. McFadden, D.; Wright, J.; Wiggs, B., et al. **Cigarette Smoke Increases the Penetration of Asbestos Fibers Into Airway Walls.** *American Journal of Pathology* 123(1):95-99, April 1986.

Cigarette smoke increases the penetration of asbestos fibers into airway walls, according to a study investigating penetration effects in guinea pigs given amosite asbestos by intratracheal instillation. It is also suggested that continued transport of fibers into interstitial tissues may be the reason that asbestosis can progress after cessation of exposure. Twenty 400 g Hartley strain guinea pigs exposed to asbestos and cigarette smoke were sacrificed at 1 week or 1 month and numbers of fibers in airway walls were counted in histologic sections. In both smoke-exposed and nonexposed groups, number of fibers per square millimeter of airway wall increased from 1 week to 1 month in the respiratory bronchioles. At each time period, smoke-exposed animals had significantly higher numbers of fibers in airway walls than nonexposed animals. Increased penetration of fibers into the airway epithelium and eventually into the interstitium, resulting in functionally increased doses of fibers to the tissues, may be one of the mechanisms whereby smoking potentiates asbestos disease.

86–1741. Mylius, E.A.; Gullvag, B. **Alveolar Macrophage Count as an Indicator of Lung Reaction to Industrial Air Pollution.** *Acta Cytologica* 30(2):157-162, March-April 1986.

Among workers in a coke plant, aluminum reduction plants, a shipbuilding yard, and asphalt work on a road, alveolar macrophage (AM) counts increased with a higher level of particulate pollution in the workplace. Smoking habits interacted synergistically with occupational air pollution. At all sites tested, exposed workers who smoked had the highest AM counts. Exposed smokers had median AM counts 70.5, 9.4, 8.3, and 61.0 times greater than exposed nonsmokers at the coke plant, aluminum reduction plant, asphalt road work, and shipbuilding yard, respectively. Median AM counts for exposed smokers at the respective sites were 17.6-, 37.6-, 15.6-, and 38.1-fold greater than those for the nonsmoking control group. It is suggested that the high numbers of AMs observed in sputa of exposed workers who smoked may represent a hazard to the lung tissue because of the leaking of enzymes from the activated AMs.

86–1742. Oliver, L.C.; Eisen, E.A.; Sprince, N.L. **A Comparison of Two Definitions of Abnormality on Pulmonary Outcome in Epidemiologic Studies.** *American Review of Respiratory Disease* 133(5):825-829, May 1986.

Definition of abnormal outcome on lung function testing has not been well standardized. Observed test results are compared with predicted values based on age, height, and sex in two ways: as a percent of the predicted (PP) and in relation to limits established by the 95 percent confidence interval around the predicted (CI). These two methods were compared in a study of pulmonary outcome in 377 railroad workers and 193 pipefitters exposed to asbestos. The sample included 179 current smokers (31.4 percent) with a mean smoking rate of 24.4±24.9 pack-years. Using accepted PP and CI criteria to define abnormal test results, subjects were classified as restricted, obstructed, or normal by each method. The proportion restricted or obstructed was higher ($p=0.0001$) if definitions were based on PP rather than on CI. Twenty-seven percent of those classified abnormal by PP were normal by CI. Independent indicators of disease were used to compare this discordant group with groups normal or abnormal by both criteria. Subjects in the discordant group were older, with more years of asbestos exposure, longer latency, and more pleural plaques ($p<0.05$). Occurrence of chronic bronchitis and dyspnea was similar to that in the abnormal group. The method of comparison had a significant effect on outcome; PP appeared a better measure of the disease. Findings suggest that age and underlying risk of the study population should be considered in selecting a method of comparison in epidemiologic studies of respiratory disease. (Auth. Abs. Mod.)

86–1743. Paggiaro, P.L.; Innocenti, A.; Bacci, E., et al. **Specific Bronchial Reactivity to Toluene Diisocyanate: Relationship With Baseline Clinical Findings.** *Thorax* 41(4):279-282, April 1986.

Bronchial response patterns to toluene diisocyanate challenge appeared to be related to smoking status in 114 furniture workers with occupational asthma induced by polyurethane varnish. An occupational type specific bronchial provocation test using toluene diisocyanate (10 to 25 parts per thousand million for 10 to 15 minutes) elicited an immediate response in 24, a late response in 50, and a dual response in 40 patients. Those with a dual response had a longer duration of symptoms and a higher prevalence of airway obstruction; forced expiratory volume in 1 second was lower than in subjects with immediate or late reactions. Percentage of current smokers and ex-smokers was significantly lower in subjects with a late response (26 percent) than in subjects with immediate or dual responses (56 and 57 percent, respectively), although the reason for this was not clear. Subjects with dual responses also showed greater nonspecific bronchial hyperresponsiveness after a nonspecific challenge than did other groups. Results suggest that a dual response to specific challenge in bronchial asthma related to toluene diisocyanate may be associated with more severe manifestation of disease than are other types of response. (Auth. Abs. Mod.)

86–1744. Rom, W.N.; Wood, S.D.; White, G.L., et al. **Longitudinal Evaluation of Pulmonary Function in Copper Smelter Workers Exposed to Sulfur Dioxide.** *American Review of Respiratory Disease* 133(5):830-833, May 1986.

A longitudinal study of pulmonary function in 113 Utah copper smelter workers reported significant declines in forced vital capacity (FVC) and forced expiratory volume in 1 sec (FEV_1) related to sulfur dioxide exposure. A followup 7 years later revealed significant increases in FVC and FEV_1. To reconcile differences between the two studies, spirometry curves from the original study were reevaluated; all had expiratory times <6 seconds. All of the curves from the spirograms obtained at followup exceeded 6 seconds. A third study of 48 of the original workers showed small annual declines over 3 years for FVC and FEV_1; declines were greater among smokers and ex-smokers. Those who gave up smoking during the study period showed improvement, but this could not explain the large differences observed. Personal exposures to sulfur dioxide were not significantly different in the studies. Thus, the findings of the original study could not be corroborated. (Auth. Abs. Mod.)

86–1745. Rylander, R.; Haglind, P. **Exposure of Cotton Workers in an Experimental Cardroom With Reference to Airborne Endotoxins.** *Environmental Health Perspectives* 66:83-86, April 1986.

Cotton workers exposed to different concentrations of airborne cotton dust with varying amounts of endotoxin had decreased forced expiratory volume in 1 second (FEV_1) that was more pronounced among smokers than among nonsmokers over a workshift. Exposure levels ranged from 0.6 to 3.6 mg dust/m^3 and from 0.1 to 8.0 $\mu g/m^3$ of endotoxin in the series of 20 experimental cardroom studies involving 91 individual observations. Airborne endotoxin levels were significantly related to chest tightness and airflow limitation, symptoms of byssinosis syndrome. The decrease in FEV_1 over the workshift was not related to amount of airborne dust. Airborne endotoxin correlated with decrease in FEV_1 and increase in blood neutrophils. It is suggested that the more pronounced decreases in FEV_1 among smokers could be due to increased numbers of neutrophils in the respiratory epithelium; alveolar macrophage activation may also play a role. It is proposed that pure lipopolysaccharide may not necessarily be the sole agent responsible for the relationship between endotoxin and different symptoms in byssinosis syndrome; endotoxin may be acting synergistically with other agents, such as cell wall proteins from gram-negative bacteria or other particulates in cotton dust.

86–1746. Schachter, E.N.; Kapp, M.C.; Maunder, L.R., et al. **Smoking and Cotton Dust Effects in Cotton Textile Workers: An Analysis of the Shape of the Maximum Expiratory Flow Volume Curve.** *Environmental Health Perspectives* 66:145-148, April 1986.

Lung function patterns of 477 cotton textile workers and 932 controls indicate that functional differences between smoking and cotton dust effects in workers may reflect injury to different portions of the bronchial tree. Cotton textile workers had increased prevalence of both obstructive and restrictive lung function patterns compared with controls, but similar abnormal lung functions patterns may occur with other respiratory diseases related to cigarette smoking. The study, using the shape of the maximum expiratory flow volume (MEFV) curve to characterize patterns of lung function abnormality, defined a new functional parameter, angle β, to better characterize respiratory effects of cotton dust versus smoking exposure. Cotton textile workers who were both current and never smokers ≥ 45 years of age were compared with controls from three separate communities. Regardless of occupational exposure or sex, smokers had smaller values of β than nonsmokers; β did not vary between cotton textile workers and controls. Males, smokers, and older individuals had smaller β values. Subjects with abnormal lung function, both obstructive and restrictive, had lower β than persons with normal patterns, and subjects with obstructive patterns had lower β than those with restrictive patterns.

86–1747. Tebbutt, G.M. **Study of Postoperative Chest Infections With Particular Emphasis on Those Caused by *Haemophilus Influenzae*.** *Journal of Clinical Pathology* 39(1):78-83, January 1986.

A history of heavy smoking, age, or abdominal surgery increased the likelihood of respiratory infection in patients admitted to a male general surgical ward. Of 103 patients who developed postoperative chest infections, 73 percent smoked >10 cigarettes per day, or had done so until recently. Fifteen percent of all patients were found to be carrying the microorganism *Haemophilus influenzae*. Except for patients with chronic bronchitis, who developed an infection with the same microorganism, carriage did not predispose patients to postoperative chest infection. *H. influenzae* accounted for 58 percent of bacterial pathogens isolated from sputum, and most infections occurred within 48 hours of operation. Chemotyping showed that most infections were caused by different strains, and cross-infection by *H. influenzae* seemed to be rare. Cefuroxime given during anaesthesia did not prevent postoperative chest infection. (Auth. Abs. Mod.)

86–1748. Tilles, D.S.; Goldenheim, P.D.; Johnson, D.C., et al. **Marijuana Smoking as Cause of Reduction in Single-Breath Carbon Monoxide Diffusing Capacity.** *American Journal of Medicine* 80:601-606, April 1986.

Heavy marijuana smoking plus tobacco smoking may damage the gas exchange surface of the lung. Pulmonary function tests were performed on 15 healthy female marijuana smokers, aged 21 to 35 years, who smoked 1.7 ± 1.4 marijuana cigarettes/day for 235 ± 135 days/year for a mean of 10.5 ± 3.7 years. Nonsmokers ($n=27$) and tobacco smokers ($n=26$, 13.0 ± 8.5 tobacco pack-years) served as controls. Marijuana smoking with or without tobacco was associated with a reduction in single-breath carbon monoxide diffusing capacity to 74 ± 20 percent of predicted, compared with nonsmokers (92 ± 11 percent, $p<0.05$). The subset of subjects who smoked marijuana and tobacco had a further reduction of single-breath carbon monoxide diffusing capacity to 65 ± 17 percent, compared with both nonsmoker and smoker controls (80 ± 7 percent). Marijuana smokers had slightly but significantly higher hemoglobin levels than nonsmokers, and significantly higher vital capacity, forced expiratory volume in 1 second, and peak expiratory flow rates than either control group. (Auth. Abs. Mod.)

86–1749. Vial, W.C. **Southwestern Internal Medicine Conference: Cigarette Smoking and Lung Disease.** *American Journal of the Medical Sciences* 291(2):130-142, February 1986.

Despite major changes in cigarette consumption patterns in the United States over the last two decades, cigarette smoking remains a widespread practice. Many studies have shown a strong association between cigarette smoking and chronic obstructive lung disease, but only recently have mechanisms been elucidated to explain this association, particularly in the case of emphysema. The exact mechanism of chronic bronchitis is less well defined. The mortality rate for lung cancer continues to increase in this country, particularly among women. Compelling evidence associates lung cancer with cigarette smoking, although animal models have not been very successful. Recently, concern has been raised about the effects of passive smoking. There are substantial data available to suggest that passive smoking results in pulmonary infections and abnormal pulmonary function in children of smokers. Data are less clear cut for pulmonary functional impairment in adults and for lung cancer in the spouses of smokers. Although the concept of "safer" cigarettes has been widely accepted by the American public, these cigarettes may not be as safe as is widely assumed. Clearly, these are far inferior to total smoking cessation. Nevertheless, smoking cessation remains difficult for many Americans despite the number of methods that have been used. Nicotine chewing gum, recently available in the United States, has shown some efficacy in helping well-motivated, nicotine-dependent smokers quit smoking. Although some inroads have been made into the occurrence of smoking-related diseases in the United States, many unnecessary deaths continue to occur. (Auth. Abs. Mod.)

86–1750. Wolff, R.K. **Effects of Airborne Pollutants on Mucociliary Clearance.** *Environmental Health Perspectives* 66:223-237, April 1986.

Long-term smoking appears to depress mucociliary clearance. Other pollutants common to the environment, including sulfur oxides, sulfuric acid mist, O_3, NO_2, particulates, and diesel exhaust, also impact upon a large number of people. A review of data shows that (1) by using radioaerosol inhalations and selecting healthy subjects, researchers were able to demonstrate delayed overall clearance in smokers, with an accumulation of material in central airways; (2) in smoking-discordant twins, clearance was depressed in smokers in about 50 percent of the cases, while when neither twin smoked, clearance was strikingly similar; (3) dramatic reductions in tracheal mucus velocities were observed in young healthy smokers; (4) cessation of smoking resulted in an improvement of mucociliary clearance after 3 months; and (5) chronic exposures of beagle dogs to cigarette smoke for 13.5 months depressed tracheal mucous velocities, while lung mechanics did not change. Data on in vivo air pollutant exposures and clearance of test particles from the airways of human and animal subjects are reviewed, and estimates of effects on human health are made. It is suggested that low level exposures and changes in secretions are responsible for most observed changes in clearance. Other mechanisms of action are also discussed.

See also, **86–1661, 86–1684, 86–1885, 86–1886, 86–1893, 86–1903**

CARDIOVASCULAR DISEASES

86–1751. Abramson, J.H. **Prevention of Cardiovascular Disease in the Elderly.** *Public Health Reviews* 13(3-4):165-233, 1985.

Diseases of the heart and blood vessels are responsible for a heavy burden of disability and suffering in the elderly and are major causes of death in old age. Findings of epidemiological studies and results of trials in middle-aged adults support the advisability of preventive intervention with respect to cigarette smoking and other risk factors, i.e., weight control, exercise, and blood cholesterol modification. Large-scale prospective studies have shown male and female smokers aged 65 to 84 have higher mortality rates than nonsmokers, with rates rising with number of cigarettes smoked. An analysis of findings of large prospective studies extending to age 80 and 84 suggests that longevity can probably be increased by giving up smoking in the 60s and, especially for heavy smokers, in the early 70s. Smokers have a 19 to 23 percent excess mortality rate at 65 to 84 years. Cessation of smoking after myocardial infarction (MI) was shown to reduce risks of reinfarction by 32 percent in middle-aged patients in one study. A study of 195 post-MI cigarette smokers aged 35 to 75 showed those who quit smoking had a 6-year cumulative mortality rate of 18.8 percent (mean age 55), compared with 30.4 percent of those who continued to smoke (mean age 57); the 6-year rates of second infarctions were 15.5 and 21.5 percent, respectively. It is suggested that stopping cigarette smoking is an effective means of intervention in elderly patients with established coronary heart disease.

86–1752. Alexander, H.M.; Balding, D.J.; Dobson, A.J., et al. **Risk Factors and Heart Disease Mortality. A Regional Perspective.** *Medical Journal of Australia* 144(1):20-22, January 6, 1986.

Mortality rates from ischemic heart disease (IHD) in the Hunter Region of New South Wales are among the highest in Australia. Within the Region, substantial differences occur in death rates from heart disease among five urban local government areas, with the highest being in the coal-mining district of Cessnock and the lowest in the resort and dormitory area of Port Stephens. A recent survey in the Region of risk factors for heart disease revealed prevalence patterns for smoking and other risk factors such as high blood pressure, serum cholesterol levels, and obesity. Smoking was especially prevalent among males in the Cessnock district (47 percent) and in Port Stephens (43 percent). Smoking prevalence in other areas was below the national average of 37 percent. Smoking among females was prevalent in the Port Stephens area (29 percent) and Maitland (25 percent). Prevalence of smoking in other areas was below the national average of 26 percent. Compared with earlier National Heart Foundation surveys (1980 and 1983), the present study shows consistent patterns of coronary risk behavior: individuals of population groups with highest blood pressure and cholesterol levels also tended to have highest prevalence of cigarette smoking and overeating, characteristics often associated with lower socioeconomic status and higher IHD mortality. It is suggested that heart disease prevention adopt a broad-spectrum approach aimed at several lifestyle modifications, rather than just one behavioral aspect, in view of evidence that health-related attitudes and behavior are characteristics of communities rather than individuals.

86–1753. Asmussen, I. **Risk Profile in Patients Admitted to Surgical Treatment for Life Threatening Atherosclerotic Lesions in Limbs, Neck and Abdominal Aorta.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 11-13.

An early debut of complicated atherosclerosis was associated with early onset of smoking in 298 patients admitted to a Copenhagen hospital for vascular surgery. A total of 93 percent of the patients were smokers, half of whom had begun the smoking habit prior to age 15. Smoking was the risk factor most strongly correlated with development of atherosclerosis; other risk factors included hypertension, diabetes mellitus, hyperlipidemia, sex, age, and family history. Often, tobacco smoking co-existed with other risk factors, such as hypertension (19 percent), mild overweight (11 percent), diabetes mellitus (6 percent). A few patients had had lues, some polycythemia, hyperuricemia, or hyperlipemia. Most patients in all age groups had had vascular problems for at least 5 to 10 years; longer histories were associated with severe lesions, e.g., occlusion of the abdominal aorta. It is suggested that the appearance of old age atherosclerotic lesions before age 50 may reflect an increased susceptibility to the hazards of tobacco by an organism in rapid growth.

86–1754. Boxen, I. **Mechanisms of Atherogenesis: Endothelial Hypoxia Proposed as the Major Initiator.** *Medical Hypotheses* 18(3):297-311, November 1985.

The major atherosclerosis risk factors hypertension, diabetes, hyperlipidemia, and cigarette smoking are reviewed, along with blood vessel anatomy, hemodynamics, and histopathology. Arguments are presented that endothelial hypoxia is the most common initiating event for atherosclerosis. The multitude of effects of cigarettes can be considered as due to carbon monoxide, nicotine, and other toxins in cigarette smoke. Carbon monoxide intake results in general hypoxia and polycythemia, affecting all blood vessels. Nicotine causes peripheral vasoconstriction, as well as increases in systolic and diastolic blood pressure, heart rate and myocontractile force, platelet aggregation, serum antidiuretic hormone and free fatty acids, arterial wall thickness and tension, and myocardial oxygen consumption. Toxins have systemic effects, such as reduced plasma high density lipoproteins, and cause pulmonary irritation and damage; this results in further hypoxia. Suggestions are given for prevention of atherosclerosis and for experiments to test the hypothesis of hypoxia as the major initiator of the disease.

86–1755. Byckling, T.; Sauri, T. **Atherosclerosis Precursors in Finnish Children and Adolescents. XII. Smoking Behaviour and Its Determinants in 12-18-Year-Old Subjects.** *Acta Paediatrica Scandinavica Supplement* 318:195-203, 1985.

Since smoking behavior is one of the major coronary heart disease risk factors, the initiation and perpetuation of smoking behavior among Finnish adolescents was a primary concern of the Multicenter Study of Atherosclerosis Precursors in Finnish Children and Adolescents. Information on smoking habits was collected from the subjects during a medical examination held in a solitary room, while data on families were obtained by general questionnaires answered by parents. The initiation and establishment of smoking habits were viewed primarily as a function of the youngsters' main socializing agents, peer group and family. Best friend's behavior was the best predictor of adolescent smoking onset, although the family retained its role as an important smoking learning model. Quitting school was a major event leading to an increased risk of becoming a habitual smoker. Prevalence of daily smoking was 1, 10, and 30 percent, respectively, in 12-, 15-, and 18-year-olds of 1,790 children and adolescents studied. No clear associations between socioeconomic status of the family and daily smoking were found, except that farmers' children had generally lower rates of daily smoking than children from other socioeconomic groups. First contacts with tobacco formed part of a normal behavior pattern at a certain age and experimentation was unrelated to a later regular habit. Smoking seemed to become part of a more general health behavioral pattern after age 15 in a young person's life. (Auth. Abs. Mod.)

86–1756. Cederholm, J. **Findings in a Health Survey of Middle-Aged Subjects in Uppsala 1981-1982. Risk Factors for Diabetes Mellitus and Cardiovascular Disease.** *Upsala Journal of Medical Sciences* 90(3):201-227, 1985.

Smoking habits and other risk factors for diabetes mellitus and cardiovascular disease were surveyed in 819 Swedish men and women aged 47 to 54 years in Uppsala in 1981-1982 and compared with data from a similar health survey of 2,300 middle-aged men conducted in 1970 to 1973. Fewer middle-aged Swedes were smoking in the recent survey, and smokers were consuming fewer cigarettes. Smokers constituted 28.5 percent of the total sample. Heavy cigarette smokers (≥ 24 cigarettes/day) constituted 5.7 percent (2.6 percent females, 9.4 percent males), and moderate smokers (15-24 cigarettes/day) 32.4 percent (27.2 percent females, 38.5 percent males). Fewer men were smokers in 1982 (31 percent) compared with those in 1973 (51 percent, $p<0.001$), and a higher proportion of males (31.3 percent) had reported quitting in the recent survey, compared with the earlier (23.2 percent, $p<0.001$). The proportion of heavy (≥ 24 cigarettes/day) smokers among males in 1982 (9.4 percent) was lower than in 1973 (17.8 percent, ≥ 20 cigarettes/day). Only 38.5 percent of male smokers consumed 15 to 24 cigarettes/day compared with 61.4 percent of men previously smoking 11 to 20 cigarettes/day. Other differences include a higher prevalence of angina pectoris, higher relative body weight, a higher frequency of treatment for hypertension, and lower rates of leisure activity in men surveyed for the present study.

86–1757. Chazova, L.V.; Baubiniene, A.V.; Glazunov, I.S., et al. **Kooperativnoye Issledovanye po Mnogofaktopnoi Profilaktike Ishemicheskoi Bolezni Serdtsa i Yevo Razvitiye v Integral'nuyu Programmu Profilaktiki Neinfektsionnykh Zabolevanii. [Cooperative Trial of Multifactor Prophylaxis of CHD and Its Development Into an Integral Program of Prophylaxis of Noncommunicable Diseases.]** *Terapevticheskii Arkhiv* 57(11):44-47, 1985, Russian.

A coronary heart disease (CHD) risk prevention program implemented over a 5-year period in two Soviet cities (Moscow and Kaunas) is described. Program participation resulted in a 22 percent decrease in smoking accompanied by a 20 to 25 percent decrease in hypertension, compared with an 11 percent decrease in smoking and a rising trend in hypertension in a control group. The reduction in number of cigarettes smoked and resultant decrease in both systolic and diastolic blood pressure reduced the risk of death by 13.6 percent among program participants. Total mortality rates were lowered by 21 percent, and cardiovascular disease deaths by 41 percent, compared with controls. The greatest decrease in 5-year mortality rates was registered among CHD patients. Analyses indicated that the smoking habit was associated not only with greater CHD mortality but also with greater cancer and total mortality. Of patients investigated, the tabulated death rate/1,000 persons/year was 4.4 (Moscow) and 5.5 (Kaunas) among nonsmokers, 7.3 and 6.0 among ex-smokers, and 9.3 and 10.4 for smokers of <11 cigarettes/day, 10.4 and 9.1 for smokers of 11 to 20 cigarettes/day, and 13.9 and 13.7 for smokers of ≥ 21 cigarettes/day. (Auth. Abs. Mod.)

86-1758. Deanfield, J.E.; Shea, M.J.; Wilson, R.A., et al. **Direct Effects of Smoking on the Heart: Silent Ischemic Disturbances of Coronary Flow.** *American Journal of Cardiology* 57(13):1005-1009, May 1, 1986.

Cigarette smoking is strongly associated with ischemic heart disease (IHD) and acute coronary events. The effects of smoking a single cigarette on regional myocardial perfusion were studied in 13 chronic smokers (consuming from 15 to 40 cigarettes/day for 10 to 40 years) with typical stable angina pectoris using positron emission tomography and rubidium-82 (^{82}Rb). Findings were compared with effects of physical exercise. After exercise, eight patients had angina, ST depression, and abnormal regional myocardial perfusion; uptake of ^{82}Rb increased from 49 ± 8 to 60 ± 7 in remote myocardium, but decreased from 46 ± 3 to 37 ± 5 in an ischemic area. The remaining five patients had homogeneous increases in ^{82}Rb uptake without angina or ST depression. In six of eight patients with positive exercise test responses, ^{82}Rb uptake decreased after smoking from 47 ± 3 to 35 ± 6 in the same segment of myocardium affected during exercise. In contrast to exercise, events during smoking were largely silent. Absolute decreases in regional ^{82}Rb uptake after smoking occurred at significantly lower levels of myocardial oxygen demand than after exercise, suggesting an impairment of coronary blood supply. In smokers with coronary artery disease, each cigarette can cause profound silent disturbances of regional myocardial perfusion that are likely to occur frequently during daily life. It is concluded that such repeated insults may represent an important mechanism linking smoking with coronary events. (Auth. Abs. Mod.)

86-1759. Foreman, M.D. **Cardiovascular Disease. A Men's Health Hazard.** *Nursing Clinics of North America* 21(1):65-73, March 1986.

Cardiovascular diseases (CVDs) are a major health hazard for men and currently account for 50 percent of all male deaths. Factors believed to contribute to the progression of atherosclerosis, the underlying etiology of CVDs, are reviewed. Cigarette smoking is associated with an increased risk of myocardial infarction and sudden death. Autopsy studies have demonstrated that smokers have a 70 percent greater incidence of death as a result of coronary heart disease (CHD) than nonsmokers, while heavy smokers (≥ 40 cigarettes/day) have a 200 percent greater incidence of death. Smoking is known to interact with and thus exacerbate the atherogenic effects of other major risk factors of CHD by affecting platelet adhesiveness, arterial endothelium, and high-density lipoprotein levels. Although most researchers and clinicians agree that evidence for cigarette smoking as a risk factor for CVD is convincing, there is some question whether the atherogenicity is related to smoking itself or to an atherogenic personality disorder manifested by smoking. Numerous atherogenic mechanisms have been postulated, but remain unproved. Although atherogenic mechanisms of cigarette smoking are not fully understood, a prompt and dramatic decline in risk of disease or death is associated with cessation of smoking. This negates the "atherogenic personality" idea and gives stronger evidence for smoking as causal.

86-1760. Frengley, P.A.; Corkill, M.M. **Physician Variables in the Treatment of Myocardial Infarction in a Single Metropolitan Hospital.** *Australian Clinical Review* 5(18):119-126, September 1985.

A medical case review of 100 consecutive patients < 66 years admitted with acute myocardial infarction (MI) showed that physician advice to stop smoking had significant impact on patients with previously established coronary artery disease (CAD). Of patients with recognized CAD (33 percent of total reviewed), 30 percent were smokers, compared with 63 percent of those initially admitted with unrecognized CAD symptoms. Only 17 percent of patients in the coronary research group continued to smoke. Of reviewed patients, 81 percent were male, with 42 in the 51 to 60 age group, 28 in the 61 to 65 age group, 21 in the 41 to 50 age group, and 9 < 40. Nine patients died during the medical record audit. Although results indicated satisfactory overall mortality rate and length of bed-stay, recommendations included improvement in facilities and staff for electrocardiograph exercise testing of MI patients, and in communication among patients, hospital staff, and general practitioners at time of discharge.

86-1761. Green, M.S.; Jucha, E.; Luz, Y. **Blood Pressure in Smokers and Nonsmokers: Epidemiologic Findings.** *American Heart Journal* 111(5):932-940, May 1986.

Although cigarette smoking produces an acute rise in blood pressure (BP), results from epidemiologic studies have generally shown smokers to have lower BP than nonsmokers, a phenomenon frequently ascribed to failure to account for other BP-associated differences between smokers and nonsmokers. Results of a large epidemiologic study of smoking and BP in a working population show a pattern of higher BP among nonsmokers and ex-smokers than among smokers. Differences could not be explained by various potentially confounding factors, such as relative weight, ethnic origin, alcohol and coffee intake, and participation in leisure time sports. While considerable adverse effects of smoking on health are well established, the role of smoking as a risk factor for hypertension is not supported by epidemiologic evidence. Data are highly suggestive of lower BP among smokers compared with nonsmokers, whereas ex-smokers have BPs similar to those of nonsmokers. (Auth. Abs. Mod.)

86-1762. Hamsten, A.; Walldius, G.; Szamosi, A., et al. **Relationship of Angiographically Defined Coronary Artery Disease to Serum Lipoproteins and Apolipoproteins in Young Survivors of Myocardial Infarction.** *Circulation* 73(6):1097-1110, June 1986.

The relationship of concentrations and composition of lipoproteins, lipid indexes, and nonlipid risk factors (tobacco consumption, hypertension, reduced glucose tolerance, and obesity) to angiographically defined coronary artery disease (CAD) was investigated in 105 consecutive male survivors of myocardial infarction (MI) and age-matched controls under the age of 45. In patients, low-density lipoprotein (LDL) cholesterol and apolipoprotein B levels were related to extent and severity of coronary atheromatosis, but not to number and severity of distinct coronary stenoses. One high-density lipoprotein (HDL) cholesterol concentration correlated inversely with coronary atheromatosis score, whereas other variables reflecting HDL concentration and composition or very low density lipoprotein lipids were not independently related to any of the coronary scores. The LDL triglyceride level was significantly correlated to coronary atheromatosis score in univariate analysis. At the time of metabolic evaluation, smoking habits were similar among patients and controls (17.3 and 19.8 g/day, respectively). There were more former smokers in the patient group (55 percent) than among controls (27 percent); 86 percent of these patients had quit at the time of MI. Cumulative lifetime tobacco consumption of present and former smokers was significantly higher in the patient group than among controls (454 vs. 286 cigarette-years). No significant correlations were found between nonlipid risk factors and coronary stenosis score in regression analysis. Thus, generally recognized nonlipid risk factors for CAD, such as tobacco consumption, did not relate to any of the estimates of CAD severity. (Auth. Abs. Mod.)

86–1763. Kocijancic, R.; Nikolic, M.; Kocijancic, M., et al. **Smoking and Cardiovascular Diseases in Young Workers.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 15-21.

Pathologic findings based on electrocardiographs were found in 12.7 percent of young and 16.8 percent of older Yugoslavian metal industry workers ($n=351$), particularly among smokers compared with nonsmokers (66.1 vs. 33.9 percent, respectively) studied for cardiovascular disease symptoms. Disturbances of heart rhythm, ventricular and supraventricular extrasystoles, were detected in 17.9 percent of older and 3.6 percent of young smokers. Smokers also tended toward hypertension. Smoking was more prevalent ($p<0.05$) among younger (≤ 27 years of age) than older workers (59.2 vs. 47.9 percent, respectively). More young men (64.3 percent) than young women (40 percent) smoked ($p=0.10$), compared with older men (57.5 percent) and older women (32.1 percent, $p<0.01$). The majority of each age group (58.1 percent young and 59.7 percent of older workers) smoked about 20 cigarettes/day. Heavy smoking (≥ 30 cigarettes/day) was more prevalent among the young (16.3 percent) than older workers (15.7 percent). The highest percentage of women, both in the young and older population (66.7 and 61.8 percent, respectively), smoked 20 to 30 cigarettes/day, while heavy smokers were only men. The majority of the study population began to smoke at 16 to 20 years of age, a tendency more common among young than older workers (64.1 vs. 57.3 percent). Many of the young workers began smoking at 11 to 15 years of age.

86–1764. Leitersdorf, E.; Gottehrer, N.; Fainaru, M., et al. **Analysis of Risk Factors in 532 Survivors of First Myocardial Infarction Hospitalized in Jerusalem.** *Atherosclerosis* 59(1):75-93, January 1986.

Age, sex, smoking, history of high blood pressure, diabetes, elevated plasma triglycerides and/or cholesterol, and decrease in plasma high-density lipoprotein cholesterol emerged as the most powerful and significant risk factors analyzed in 532 survivors of myocardial infarction. A case—control study (869 controls) of Jewish patients under 65 was conducted from 1979 to 1983 to evaluate the importance of conventional risk factors and to detect additional factors by quantifying plasma apolipoprotein concentrations. Smoking seemed to be a most important risk factor for myocardial infarction. Prevalence of current smoking was almost twice as high in patients as in controls for both males and females. In all ethnic groups, 73 to 90 percent of cases among males <65 were current smokers. In females, the most pronounced difference in smoking habits (cases vs. controls) was among those of Asian extraction. Number of cigarettes consumed among current smokers was almost twice as high in cases compared with controls ($p<0.05$), except for males of Asian and North African origin >55 years of age. (Auth. Abs. Mod.)

86–1765. Lemak, N.A.; Fields, W.S.; Gary, H.E., Jr. **Controlled Trial of Aspirin in Cerebral Ischemia: An Addendum.** *Neurology* 36(5):705-710, May 1986.

Smoking does not appear to affect the risk of stroke for patients with transient ischemic attacks (TIA). In a large multicenter trial, aspirin or placebo was administered to patients with episodes of monocular blindness (amaurosis fugax), hemisphere TIAs, or minor stroke and to patients with similar histories who had carotid endarterectomy before the trial. Of the 303 patients participating, 53 percent were smokers, comprising 68 percent of black males, 59 percent of white males, 48 percent of black females, and 32 percent of white females. A total of 70 percent of nonsmokers and 77 percent of smokers showed a favorable response regardless of treatment assignment. Only patients with lesions of the appropriate carotid artery responded better to aspirin therapy than patients with no lesion or an occlusion. The aspirin effect was the same across all risk-factor groups. Smoking had no effect on clinical outcome.

86–1766. Macek, M.; Rutenfranz, J.; Andersen, K.L., et al. **Favourable Levels of Cardio-Vascular Health and Risk Indicators During Childhood and Adolescence.** *European Journal of Pediatrics* 144(4):360-367, November 1985.

Regular tobacco smoking was rare among randomly selected Czechoslovakian children aged 8, 12, and 16 years studied for favorable levels of cardiovascular health and risk indicators during childhood and adolescence. Smoking is considered to be unhealthful by schools and the Government; also, cigarettes are highly priced. Of 129 children tested, only 2 boys aged 16 admitted smoking (< 10 cigarettes/day). The low prevalence of habitual cigarette smokers (9 percent of 16-year-olds) contrasts with that of most affluent societies today; in a rural German community, 41 percent of boys and 52 percent of girls were smokers at age 16. Maximal absolute oxygen uptake increased with age in both sexes studied, but boys appeared to average higher than girls at each age. When maximal aerobic power was expressed on a total body weight basis, boys appeared to average higher at age 16 years than girls. The highest recorded heart rate for ergometric work averaged close to 200 min^{-1} in both sexes with no significant age differences. Diastolic blood pressure at rest did not change significantly with age or sex. Serum cholesterol levels were found to decrease significantly after puberty in boys, but no systematic variations with age were found in girls. Neither high density lipoprotein, expressed as a percentage of total cholesterol, nor apolipoproteins or fasting serum triglycerides varied significantly with age or sex. Interrelationships of different health indicators and influences of lifestyle on risk factors are also discussed. (Auth. Abs. Mod.)

86–1767. Masarei, J.R.L.; Kiiveri, H.T.; Stanton, K. **Risk Factors for Cardiovascular Disease in a Diabetic Population.** *Pathology* 18(1):89-93, January 1986.

Smoking was associated with substantially increased risk of cardiovascular disease (CVD) in diabetics up to 70 years of age. Other significant CVD associations were age, high-density lipoprotein cholesterol, diastolic blood pressure, and interaction between smoking and age and between treatment mode and blood pressure. CVD was diagnosed on the basis of (1) past history of myocardial infarction; (2) definite angina; (3) an electrocardiogram abnormality diagnostic of ischemia; and/or (4) cardiomegaly and/or pulmonary congestion on chest x ray. Although there were a few heavy smokers (≥20 cigarettes/day), most smokers in the study consumed ≤20 cigarettes/day. Up to the age of 65 years, the prevalence of CVD was appreciably higher in smokers than in nonsmokers; thereafter, the trend reversed. It is postulated that smokers who survive to the age of 65 have in some way been selected out as a group with unusual protection from CVD, although other explanations might also be true. Variables examined were sex, age at time of study, age at diabetes onset, duration of diabetes, mode of treatment, control (as assessed by fasting and postprandial plasma glucose concentrations and glycosylated hemoglobin concentration), insulin levels in subjects not on insulin, obesity, blood pressure, total- and high-density lipoprotein and triglyceride concentrations, and smoking. As in the population generally, high-density lipoprotein cholesterol was the lipid variable showing the most significant association with CVD. (Auth. Abs. Mod.)

86–1768. Mathes, P. **Kann die Prognose Nach Einem Herzinfarkt Verbessert Werden? [Can Prognosis After Myocardial Infarction Be Improved?]** *Therapiewoche* 36(4):219-220, 222, 224, 226, January 20, 1986, German.

Ninety percent of patients who continued to smoke after myocardial infarction (MI) died, compared with less than 40 percent among those who stopped smoking. Results of a 14-year study indicate that smoking is the number one risk factor for post-MI patients. Longer duration smokers had higher mortality rates, and smoking was more harmful for post-MI patients (risking recurrent MIs) than for those with bypass operations. It is suggested that coronary heart disease rehabilitation strategy aim toward reducing or stopping progression of coronary arteriosclerosis and that health education include social and psychological aspects of smoking cessation. Other risk factors for recurrent MI (after smoking) are hyperlipidemia, arterial hypertension, lack of physical activity, and obesity. Physical exercise in secondary prevention has a two-sided effect: it is an educational vehicle and an independent prognosticator. It is suggested that although extensive myocardial damage implies a poor prognosis, both symptoms and prognosis of a multivessel disease can be improved by bypass surgery.

86–1769. Petelenz, T.; Knosala, P.; Skrzypek-Wanha, J., et al. **Analiza Czynnikow Zagrozenia u Chorych na Zawal Serca Leczonych w III Klinice Kardiologii Sl. AM w Katowicach w Latach 1976-1983. [An Analysis of Risk Factors in Patients With Myocardial Infarction Treated at the III Department of Cardiology, Silesian Medical Academy in Katowice Within 1976-1983.]** *Polski Tygodnik Lekarski* 41(9):265-269, March 3, 1986, Polish.

Tobacco smoking was an important risk factor in an analysis of 340 patients suffering from myocardial infarction (MI). Of those MI patients investigated further (285 males, 5 females), 55.5 percent smoked. Consumption varied from light to heavy smoking. Incidence of MI in males was also greater than in female patients. Tobacco smoking, hypercholesterolemia, hypertension, obesity, carbohydrate metabolism disorders, and low physical activity were prevailing risk factors among male patients. Hypertension, obesity, carbohydrate metabolism disorders, followed by hypercholesterolemia, tobacco smoking, and low physical activity were the most common causative factors in female patients. Tobacco smoking coexisting with hypercholesterolemia, tobacco smoking with hypertension, and tobacco smoking with carbohydrate metabolism disorders were the most frequently observed risk factor combinations. Risk factor distribution differed in female patients. MI incidence in both male and female patterns correlated with risk factors of individual age groups. (Auth. Abs. Mod.)

86–1770. Saumet, J.L.; Leftheriotis, G.; Dittmar, A., et al. **Relationship Between Pulse Amplitude and Thermal Exchange in the Finger: The Effect of Smoking.** *Clinical Physiology* 6(2):139-146, April 1986.

Finger pulse amplitude and heart rate (HR) were compared in 24 healthy males (17 smokers) aged 20 to 30 years before and after they smoked a single cigarette. Finger thermal exchange was measured using a direct calorimeter of recording and reference baths, each filled with water at 18°C. Subjects immersed the two distal phalanges of a finger into the recording bath; the water thermal gradient between both baths after 4 minutes of finger immersion and maximal value of heat loss from finger to water were recorded. Decreases in the water thermal gradient (from 6.06 to 5.33°C, $p<0.05$), in maximal value of heat loss (from 22.5 to 18.75 w/m^2, $p<0.01$), and in plethysmographic wave amplitude (from 25.8 to 14.6 mm, $p<0.01$) and an increased HR (from 72 to 83 beats/min) were observed in smokers. These changes were not statistically significant in nonsmokers. Water thermal gradient and maximal value of heat loss correlated with plethysmographic wave amplitude before and after smoking, but not with HR in the volunteers studied. Thus, there was a good relationship between vascular phenomena and thermal exchange in the fingers. It is suggested that variations of finger pulse amplitude provide an adequate and sensitive adjustment of thermal exchange since the effects of smoking a single cigarette can be detected by both plethysmographic wave amplitude and calorimetric measurements in the finger. (Auth. Abs. Mod.)

86–1771. Sue-Ling, H.M.; Johnston, D.; McMahon, M.J., et al. **Pre-Operative Identification of Patients at High Risk of Deep Venous Thrombosis After Elective Major Abdominal Surgery.** *Lancet* 1(8491):1173-1176, May 24, 1986.

Cigarette consumption was studied as a preoperative predictor of deep venous thrombosis (DVT) in 85 patients who underwent elective major abdominal surgery. Postoperatively, DVT was detected by ^{125}I-fibrinogen scan in 23 patients. Stepwise logistic discriminant analysis identified several factors that were used to construct a predictive index. In descending order of predictive power they were: age (<0.0001), euglobulin lysis time (ELT) (<0.0083), previous abdominal surgery (<0.321), varicose veins (<0.324), antithrombin III concentration (<0.101), cigarettes/day (<0.273), and platelet count (<0.136). Cigarettes/day, age, ELT, antithrombin III, and percent of malignancy were preoperative measurements significantly correlated with DVT after operation (<0.02). Preoperatively, the predictive index correctly identified 91 percent of patients in whom DVT developed, and wrongly allocated to the high-risk group 19 percent of those in whom it did not. A shortened version of the predictive index based only on age and ELT was 91 percent sensitive and 63 percent specific in the prediction of DVT. In a prospective study of 43 patients, this shortened predictive index correctly identified preoperatively 93 percent of patients in whom DVT developed, and wrongly allocated to the high-risk group only 17 percent of those in whom it did not. (Auth. Abs. Mod.)

86–1772. Tenkanen, L.; Teppo, L.; Hakulinen, T., et al. **Age Dependence of the West/East Gradient in Cardiovascular Mortality of Finnish Males.** *Acta Medica Scandinavica* 218(5):463-471, 1985.

Cardiovascular disease (CVD) mortality among Finnish males, who have a longer history of smoking than men of other Nordic countries, has been shown to vary regionally with a west/east gradient and to be highly age-dependent. The west/east difference in CVD mortality (particularly ischemic heart disease (IHD)) and its relation to smoking, age, and cohort history were examined in 4,475 Finnish men, categorized into nonsmokers, ex-smokers, and those smoking <15 g/day, 15-24 g/day, and ≥ 25 g/day. Of 1,269 CVD deaths (846 from IHD and 238 from cerebrovascular diseases), the relative risk of IHD death of smokers vs. nonsmokers was 1.6. The percentage of heavy smokers was higher in eastern rural areas, and younger cohorts consumed more cigarettes than older groups, leading to the suspicion that smoking may be the cause of the west/east risk gradient. Compared with lung cancer and other causes, only CVD and IHD mortalities showed significant regional differences ($p<0.01$). The interaction of cohort and region was also significant ($p<0.01$). The extra risk associated with the eastern region was confined to the two youngest birth cohorts. It is concluded that smoking as an element in the west/east gradient of IHD mortality appeared to have a minor role with the risk factor being little altered whether or not smoking was controlled in the model. Similarly, the interaction between smoking and the regional factor was not significant.

86–1773. Tuomilehto, J.; Jalkanen, L.; Salonen, J.T., et al. **Factors Associated With Changes in Body Weight During a Five-Year Follow-Up of a Population With High Blood Pressure.** *Scandinavian Journal of Social Medicine* 13(4):173-180, 1985.

Smoking was an important factor associated with changes in body weight during a 5-year followup of a population with high blood pressure. Finnish men and women who had participated in a 1972 cardiovascular disease prevention program and whose systolic blood pressure was ≥ 175 or diastolic ≥ 100 mm Hg or who were undergoing antihypertensive treatment were invited for re-examination in 1977. Mean body mass index (BMI) value increased 0.4 kg/m^2 and 0.2 kg/m^2 in men aged 25 to 49 and 50 to 59 years, respectively. In women, BMI increased an average of 0.5 kg/m^2 in the 25- to 49-year age group, but decreased an average of 0.2 kg/m^2 in the 50- to 59-year age group. In men and women together, the BMI mean value increased by 0.11 kg/m^2 in nonsmokers and 0.41 kg/m^2 in regular smokers (smoking in both 1972 and 1977). People who had stopped smoking during the 5 years increased their mean BMI by 1.05 kg/m^2, whereas people who had started smoking decreased their mean BMI by 0.66 kg/m^2. These differences in BMI changes were statistically significant. In men, the change in body weight exerted the strongest partial regression on changes in smoking, age, and physical activity both in leisure time and at work. In women aged 25 to 49 years, the reasons for increased body weight were the same as in men. In older women aged 50 to 59 years, the decrease in body weight was associated with age, change in amount of smoking, and initiation of antihypertensive drug therapy.

86–1774. World Health Organization. **Community Prevention and Control of Cardiovascular Diseases.** World Health Organization, Report of a WHO Expert Committee, Technical Report Series 732, Geneva, 1986, 62 pp.

Smoking, a major cause of premature coronary heart disease, peripheral vascular disease, and stroke, remains a major health hazard because of the addictive power of nicotine, the strength of social pressures, and the persuasive pressures from both private and state-owned industries with major economic interests in promoting smoking. The World Health Organization Expert Committee on Community Prevention and Control of Cardiovascular Diseases meeting in Geneva, December 1984, has recommended that (1) a smoke-free society in the foreseeable future be promoted by governments and national medical associations; (2) comprehensive smoking control plans be developed and implemented to stem a rising smoking epidemic; (3) all advertising and promotion of tobacco products be banned by law in all countries; (4) smoking in television programs and films be discouraged; (5) taxation of tobacco products be maintained as a deterrent to smoking by young people; (6) smoking in public places and public transportation be banned by governments; (7) reduction of tar and nicotine levels in cigarettes not be advocated as a means of reducing the risks associated with smoking; (8) alternative crops and crop diversification be encouraged in tobacco-growing developing countries; (9) tobacco monopolies be diversified; and (10) smoking prevention activities be monitored.

See also, **86–1799, 86–1810, 86–1860**

PREGNANCY AND INFANT HEALTH

86–1775. Counsilman, J.J.; Mackay, E.V. **Smoking Habits of Pregnant Women in Brisbane, Australia.** *Australian and New Zealand Journal of Obstetrics and Gynaecology* 25(4):244-247, November 1985.

Women surveyed in Australia either reduced or gave up smoking just before or shortly after becoming pregnant, but their husbands showed no comparable changes in smoking behavior. Thus, many couples were aware of fetal dangers posed by active maternal smoking, but not of those from passive inhalation of smoke. Of 1,790 women interviewed, the number who smoked before becoming pregnant (28.5 percent) was similar to that for Australian women in general (29.2 percent). The number smoking while pregnant (21 percent), was substantially lower ($p < 0.0001$). The proportion of husbands who smoked during their wife's pregnancy (38.9 percent) was also similar to the national incidence (41.2 percent). Nearly all women surveyed smoked filter cigarettes (97 percent), inhaled (94 percent), and smoked two-thirds or more of each cigarette (95 percent). Most smoked nonmentholated cigarettes (75 percent), and a large proportion (42 percent) smoked the same brand (Winfield), probably because of intensive and extensive advertising strategies by the tobacco company. Heavy smokers tended to smoke lower tar cigarettes. Survey data also indicated that women tended to increase cigarette consumption rates with each subsequent pregnancy, and that heavy smokers tended to have begun smoking at a very early age.

86–1776. Gastrin, G. **Smoke-Free Pregnancy: Smoking Cessation as an Integral Part of Pre-Natal Health Care.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 183-186.

Pregnant women are a particularly high priority target group for intervention in smoking behavior by health professionals. This is because (1) smoking control is an important public health issue involving many institutions that should also include maternity health care; (2) personal contact between health professionals and pregnant women creates a favorable condition for simple cessation counseling; and (3) minimum intervention with appropriate materials requires a minimum amount of time. More formal training is suggested for midwives, including knowledge of medical facts on smoking and health in general, and smoking and pregnancy in particular, and psychological and sociological facts regarding the smoking habit and its modification. Methodology for intervention by education and treatment (including knowledge of available data and their proper use) should include (1) motivating education to create awareness of the problem and desire to stop; (2) encouraging education to promote an actual decision to stop; (3) supporting education to improve abilities to cope with abstinence problems; and (4) supporting treatment to eliminate abstinence symptoms that may induce relapse. A program designed and implemented with these principles involving specially trained midwives in Sweden and Finland is described.

86–1777. Kruse, J.; Le Fevre, M.; Zweig, S. **Changes in Smoking and Alcohol Consumption During Pregnancy: A Population-Based Study in a Rural Area.** *Obstetrics and Gynecology* 67(5):627-632, May 1986.

A survey of 255 Missouri women found that fear for the infant's health was the most common reason for decreasing smoking and drinking during pregnancy. Advice from doctor, family, friends, or media, or adverse physical effects of tobacco or alcohol were less important factors influencing behavior. It was difficult to predict changes based on demographic and behavioral characteristics such as age, income, education, attendance at childbirth classes, desirability of pregnancy, and method of infant feeding. About 28 percent of the women reported smoking at least one cigarette per day in the 12 months before pregnancy, while 49 percent reported consuming at least one drink per week. Women aged <30 years were more likely to smoke than women aged ≥ 30 years (31.9 vs. 17.2 percent, $p<0.05$), and women with only a high school education or less were more likely to smoke than women with some education beyond high school (34.0 vs. 19.8 percent, $p<0.02$). Smoking rates were significantly lower among women with annual household incomes between 18,000 and 30,000 dollars than for women with household incomes $<18{,}000$ or $>30{,}000$ dollars. Of prepregnancy smokers, 33.3 percent decreased the number of cigarettes smoked/day, and 16.7 percent stopped smoking completely during pregnancy. Women were more likely to modify alcohol than cigarette consumption. More than 53 percent stopped alcohol consumption completely during pregnancy, compared with a 16.7 percent smoker cessation rate.

86–1778. McKnight, A.; Merrett, J.D. **Smoking in Pregnancy—A Health Education Problem.** *Journal of the Royal College of General Practitioners* 285(36):161-164, April 1986.

Only 11.5 percent of 191 females quit smoking with onset of pregnancy in a Belfast survey, despite their knowledge (65 percent) that smoking could adversely affect the infant. Of the smokers, 67 (35.1 percent) smoked ≤ 10 cigarettes/day, 97 (50.8 percent) smoked 11 to 20, 17 (8.9 percent) smoked 21 to 30, and 10 (5.2 percent) smoked >30. Of the 380 patients surveyed, 31 were aged ≤ 20 years and included 18 (58.1 percent) smokers. The majority of patients ($n=326$) were between 21 and 34 years of age and included 160 (49.2 percent) smokers. Only 23 patients were aged ≥ 35 years and included 12 (52.2 percent) smokers. Of 348 patients who were married or cohabitating, 168 (48.1 percent) were smokers, and 117 of their partners (69.9 percent) also smoked. Thirty-one patients had no partner, and 23 (74.2 percent) of these were smokers. Of the 181 nonsmokers, 61 (33.7 percent) had partners who smoked. The total sample was made up of 112 primigravidae, 49 (43.7 percent) of whom smoked, and 268 multiparous patients, of whom 142 (53 percent) smoked. It is suggested that more emphasis be placed on health education for schoolchildren and that more individual effort on the part of health professionals be made to dissuade women from smoking, especially during pregnancy.

86–1779. Murray, A.B.; Morrison, B.J. **The Effect of Cigarette Smoke From the Mother on Bronchial Responsiveness and Severity of Symptoms in Children With Asthma.** *Journal of Allergy and Clinical Immunology* 77(4):575-581, April 1986.

Asthmatic children of mothers who smoke had 47 percent more symptoms, a 13 percent lower mean forced expiratory volume in 1 second (FEV_1), a 23 percent lower mean maximal midexpiratory flow rate between 25 and 75 percent ($FEF_{25\text{-}75\ \text{percent}}$) of forced vital capacity (FVC), and a fourfold greater responsiveness to aerosolized histamine than children of nonsmokers. Children (aged 7 to 17) with a history of asthmatic wheezing were separated into two groups on the basis of whether the mother did or did not smoke. Groups were comparable for age, gender, exposure to airborne irritants and allergens, percent with surgical operations, percent with frequent colds, proportion of subjects with atopy, degree of sensitivity to house dust mites, and having fathers who smoke. The study showed a significant correlation between results of tests and number of cigarettes the mother smoked while she was in the house. Differences between children of smokers and nonsmokers were greater in older than in younger subjects. By contrast, the smoking habits of the father were not correlated with the severity of the child's asthma. It is suggested that physicians who observe children with asthma determine the smoking habits of parents. Parents who smoke should be advised to stop smoking, at least when they are in their houses.

86–1780. Nasrat, H.A.; Al-Hachim, G.M.; Mahmood, F.A. **Perinatal Effects of Nicotine.** *Biology of the Neonate* 49(1):8-14, January 1986.

The gestation period in pregnant Swiss albino mice was significantly shortened in second and third trimesters ($p<0.05$ and $p<0.01$) and perinatal mortality was increased in mice administered large doses of nicotine, indicating that effects of smoking may be particularly harmful late in pregnancy. Nicotine alkaloid as a base was administered to three groups of mice during each trimester of pregnancy, at three doses (900, 1,800, and 2,700 μg/kg/day), corresponding to three levels of smoking (10, 20, and 30 cigarettes/day, respectively). To determine the most vulnerable stages of pregnancy, each nicotine dose was administered subcutaneously to a group of animals during each trimester. Perinatal effects, i.e., gestation period, percent of delivering mothers, male to female ratio of offspring, and perinatal mortality (still birth and neonatal death) were observed. (Auth. Abs. Mod.)

86–1781. Rowell, P.P.; Leventer, S.M.; Clark, M.J. **The Effect of Cigarette Smoking During Pregnancy on the Cholinergic System in Isolated Term Human Placental Tissue.** *Biology of Reproduction* 34(2):344-348, March 1986.

The hypothesis that lower birth weights of infants born to smokers are mediated by an effect of nicotine or other tobacco components on the placental cholinergic system was not supported by results of isolated term human placental tissue studies. It had been suggested that nicotine interacts with the placental cholinergic system to depress the transport of nutrients to the fetus and, therefore, depresses fetal growth. Levels and activities of several components of the term placental cholinergic system were determined in smokers and nonsmokers to investigate whether this system is involved in the effect of smoking. No statistically significant differences were found in the levels, synthesis, or release of acetylcholine in tissues of smokers and nonsmokers, nor in activities of the choline uptake system or the enzymes choline acetyltransferase, cholinesterase, or sodium/potassium adenosine triphosphatase. An alternative explanation is offered that nicotine action may be mediated through the autonomic nervous system, where ganglionic and adrenal medullary stimulation lead to increased circulating catecholamines with a resultant uterine vasoconstriction. It is suggested that nicotine produces long-term fetal adrenergic stimulation that could retard fetal growth.

86–1782. Stjernfeldt, M.; Berglund, K.; Lindsten, J., et al. **Maternal Smoking During Pregnancy and Risk of Childhood Cancer.** *Lancet* 1(8494):1350-1352, June 14, 1986.

The risk of cancer in offspring is correlated with the number of cigarettes smoked daily by the mother during pregnancy, according to a case—control study of childhood cancer. When all tumor sites were considered, the overall risk for cancer in children exposed to ≥ 10 cigarettes/day during pregnancy increased by 50 percent ($p<0.05$); a statistically significant linear trend ($p<0.05$) was also observed. When single sites were compared, Wilms' tumor, non-Hodgkin's lymphoma, and acute lymphoblastic leukemia (ALL) showed doubled risk; only for ALL, however, were the increased risk and linear trend statistically significant ($p<0.01$). Children with solid tumors showed relative-risk estimates close to unity, with no apparent linear trend. Risk was almost doubled for children with ALL, compared with children with solid tumors; this difference was statistically significant ($p<0.05$). (Auth. Abs. Mod.)

See also, **86–1880, 86–1884**

OTHER DISEASES AND CONDITIONS

86–1783. Ablin, R.J. **Cigarette Smoking and Quality of Sperm. (Letter).** *New York State Journal of Medicine* 86(2):108, February 1986.

Spermatozoa from smokers had significantly decreased density and motility ($p<0.001$) compared with those from nonsmokers in a blind study of smoking effects on sperm quality in an age-related population of 103 smokers averaging ≥ 4 cigarettes/day for last 5 years and 135 nonsmokers for last 5 years. Analysis of individual sperm counts indicated that more than twice as many smokers ($n=77$, 75 percent) had a sperm density of less than 40×10^6 sperm/mL (considered to be the lower limit of the range of normal) than did nonsmokers ($n=35$, 26 percent). Morphologic abnormalities, particularly bicephalia, appeared to be more prevalent among smokers than nonsmokers, but the difference was not significant. On the basis of the demonstrated presence of mutagenic properties of smoke condensates, e.g., ability to induce sister-chromatid exchanges in peripheral blood lymphocytes, it is suggested that decreases in sperm density and motility in smokers may also be reflective of smoke condensate-induced mutagenic spermatogenital alterations. Reduction of sperm motility in men who smoke may also reflect presence of inhibitors of choline acetyltransferase that facilitates sperm motility in smoke condensates.

86–1784. Bauchinger, M.; Schmid, E. **Cytogenetic Effects in Lymphocytes of Formaldehyde Workers of a Paper Factory.** *Mutation Research* 158(3):195-199, 1985.

Chromosome analyses of lymphocytes in 20 male papermakers exposed to formaldehyde (FA) for 2 to 30 (average 14.5 ± 7.2) years showed increased incidence of dicentrics or dicentrics and ring chromosomes, particularly in longer-exposed supervisory personnel, compared with nonexposed controls. The difference in observed incidence of sister-chromatid exchanges (SCEs) between smokers in the formaldehyde-exposed and in the control groups was not significant. Similarly, the SCE frequencies of exposed vs. nonexposed nonsmokers were not significantly different. However, within exposed and nonexposed groups, a significantly higher incidence of SCEs was found for smokers ($p<0.05$). When data for FA-exposed supervisors and operators were analyzed separately, supervisors showed greater incidence of dicentrics or dicentrics and ring chromosomes than operators. Mean occupational exposure to FA was 2.5 times longer for supervisors. Although supervisors were older than operators (47.6 ± 7.5 vs. 40.8 ± 11.2 years), the influence of age on aberration frequency was not examined.

86–1785. Bright-Asare, P.; Sontag, S.J.; Gould, R.J., et al. **Efficacy of Misoprostol (Twice Daily Dosage) in Acute Healing of Duodenal Ulcer. A Multicenter Double-Blind Controlled Trial.** *Digestive Diseases and Sciences* 31(2):63S-67S, February 1986.

Duodenal ulcers healed faster in nonsmokers than in smokers after 4 weeks of treatment in a multicenter, double-blind, controlled comparison trial of placebo with misoprostol 200 µg and 400 μg. Healing rates of patients on 200 μg doses of misoprostol were 42.6 percent among smokers and 61.4 percent among nonsmokers. For misoprostol 400 μg, the healing rates were 59.1 percent for smokers and 73.0 percent for nonsmokers. Healing rates of patients on placebo were about 42 percent in smokers and nonsmokers. Overall healing rates were 42.2 percent for placebo, 52.9 percent for misoprostol 200 μg, and 65.4 percent for misoprostol 400 μg. Misoprostol at 400 but not 200 μg was superior to placebo ($p=0.002$) in healing ulcers. (Auth. Abs. Mod.)

86–1786. De Lavernhe-Lemaire, M.-C.; Garand, G. **Effet de la Nicotine sur les Fonctions Auditives du Rat, Explore par Electrocochleographie et Potentiels Evoques Auditifs du Tronc Cerebral. Travail Preliminaire. [Nicotine and Auditory Pathway in the Rat. BASR and Electrocochleography Study.]** *Archives Internationales de Physiologie et de Biochimie* 93(4):253-261, November 1985, French.

The effects of nicotine (100 μg/kg) on brainstem auditory-evoked responses (FFP) and electrocochleography (EcoG) were studied in rats anesthetized with pentobarbital. Each component of FFP and EcoG was analyzed in terms of its latency and amplitude. Nicotine failed to produce any significant changes in latencies of FFP and EcoG components. After 30 minutes, amplitude I, I′, II, and III of FFP components were significantly increased, while IV and V components showed no significant decrease. Findings suggest muscarinic and nicotinic effects of nicotine in the mediation of the brainstem auditory pathway. (Auth. Abs. Mod.)

86–1787. Fahrlander, H. **Epidemiologie, Pathogenese, Verlauf und Folgen der Crohnschen Erkrankung. [Epidemiology, Pathogenesis, Progression, and Consequences of Crohn's Disease.]** *Schweizerische Medizinische Wochenschrift* 115(Supplement 19):21-29, 1985, German.

The epidemiology, pathology, progression, and consequences of Crohn's disease are reviewed and the following conclusions are made: (1) epidemiological data show a fivefold increase in incidence of Crohn's disease between 1950 and 1970; the incidence is higher in urban than in rural areas; (2) significance of such environmental factors as nicotine, sugar, and fat has not been established; (3) L-forms of mycobacteria may be the cause of the disease; (4) intestinal immunoregulation is not impaired; (5) natural history is poorly influenced by drugs and "curative" resection; (6) male, but not female, fertility may be impaired; and (7) the risk of cancer is only slightly increased. (Auth. Abs. Mod.)

86–1788. Hand, J.S.; Whitehill, J.M. **The Prevalence of Oral Mucosal Lesions in an Elderly Population.** *Journal of the American Dental Association* 112(1):73-76, January 1986.

Tobacco and alcohol use, education, and time since last dental visit were associated with an increased risk for denture-related lesions in the elderly ≥65 years of age. In a population of 629 elderly subjects, 23 percent had at least one mucosal lesion; 27 percent of denture wearers reported having a denture-related lesion. Lesions were most common on the palate, followed by the lips. Increasing age was the only significant factor in the risk of soft tissue enlargement. People who used at least one tobacco product (odds ratio, OR = 2.72) and people who used alcohol (OR = 1.66) were more likely to have a lesion than were nonusers. People who used both tobacco and alcohol were over four times as likely (OR = 4.6) to have a denture-related lesion than were those who used either tobacco or alcohol, or neither. People who had not visited a dentist in at least 3 years were more than twice as likely (OR = 2.24) to have a denture-related lesion than people with more frequent visits. Age and gender were not significantly related to prevalence of denture-related lesions. People with less than 12 years of education were twice as likely (OR = 1.99) to have a denture-related lesion than were high-school graduates.

86–1789. Hansen, T.H.; Christiansen, K.H. **Rygning og Ulcus Duodeni. [Smoking and the Duodenal Ulcer.]** *Ugeskrift for Laeger* 147(51):4175-4177, December 1985, Danish.

Epidemiological, pathophysiological, and clinical investigations concerning healing and recurrence all point to a negative relationship between smoking and duodenal ulcer, on the basis of a review of all relevant literature. It is emphasized that controlled clinical investigations are required to measure directly the effect of cessation of smoking on healing and incidence of recurrence. On the basis of present knowledge, it is recommended that all patients with duodenal ulcer be warned against smoking. (Auth. Abs. Mod.)

86–1790. Hollanders, D.; Morrissey, S.M. **Histochemistry of Gastric Mucins in Smokers and Non-Smokers.** *British Journal of Clinical Practice* 40(2):74-77, February 1986.

Smokers appear to have reduced acid mucosubstance concentrations in gastric epithelium, compared with nonsmokers, but whether this is a direct effect of smoking is not conclusive. Preselected stomach site biopsies of 15 smokers (≥10 cigarettes/day) and 12 lifetime nonsmokers were compared in a quantitative histochemical analysis of gastric mucosa mucosubstances. Neural (PAS-positive) mucosubstances in mucin content of both groups occurred in equal quantities at all four sites biopsied (i.e., antrum, mid-lesser curve, mid-greater curve, and fundus). However, for total acid (AB-positive) mucosubstances, nonsmokers tended to have larger quantities in gastric mucosa than smokers, a difference reaching statistical significance in mucosa taken from the greater curve ($p=0.036$). Overall, acid staining mucosubstances occurred at considerably lower concentration than neutral mucins in both groups. When acid mucins were assessed according to biopsy site, a statistically significant difference emerged between the larger mucin content of fundic mucosa compared with that of the lesser curve ($p<0.05$) and the greater curve ($p<0.01$). This difference held true for both smokers and nonsmokers, though the quantity of acid mucin in nonsmokers was greater. It is speculated that the observed alteration in gastric mucus composition in smokers may contribute to higher incidence of gastric and peptic ulcer disease by impairing the mucus/bicarbonate barrier mechanism.

86–1791. Kandel, D.B.; Davies, M. **Adult Sequelae of Adolescent Depressive Symptoms.** *Archives of General Psychiatry* 43(3):255-262, March 1986.

Both current and lifetime use of cigarettes were related to the incidence of adolescent depression in a followup study of 1,004 young adults (mean age 24.7 years) who had participated in a high school survey on depressive mood 9 years earlier. Among males classified as being depressed in high school, 57 percent smoked daily within the last year versus 30 percent among males not depressed; comparable figures for female subjects were 50 and 34 percent, respectively. Adolescent depression was significantly associated with heavy cigarette smoking, feelings of dysphoria, increased use of minor prescription tranquilizers (among women), more deviant activities and accidents as young adults, and selective effects on interpersonal relationships. Formerly depressed men were less likely to be marijuana smokers. Long-term effects of adolescent depression included a reduced ability to establish an intimate relationship with a member of the opposite sex. (Auth. Abs. Mod.)

86–1792. Kaye, B.L. **Association Between Cutaneous Occlusive Vascular Disease, Cigarette Smoking, and Skin Slough After Rhytidectomy. Cigarette Smoking and Face Lift: Conservative Versus Wide Undermining. Discussion. (Letter).** *Plastic and Reconstructive Surgery* 77(4):603-604, April 1986.

Plastic surgeons are becoming more aware of the deleterious effects of smoking on wound healing and its role in producing slough in face lift operations. Health history questionnaires have been redesigned to ask if anyone else in the household smokes as well as whether the patient has smoked in the past, how much, and for how long. Patients are advised to stop smoking for at least 2 weeks prior to and 1 week after surgery because (1) smoking has a deleterious effect on wound healing and can significantly increase the incidence of skin and hair loss; (2) smokers tend to cough more than nonsmokers, and postoperative coughing can increase the possibility of hematoma (which also adds an increased risk of slough); and (3) smokers under general anesthesia are subject to an increased incidence of postoperative pulmonary complications. Conservative undermining avoids skin slough by keeping most of the skin circulation intact. Postoperative results show a significant but less than spectacular improvement. For those smokers willing to accept lesser results, this conservative approach is a viable alternative. Such results can be improved even more by an early, equally conservative, secondary operation, such as the 6-week, two-stage face lift procedure.

86–1793. Kelly, H.W.; Powell, J.R.; Donohue, J.F. **Ranitidine at Very Large Doses Does Not Inhibit Theophylline Elimination.** *Clinical Pharmacology and Therapeutics* 39(5):577-581, May 1986.

Large doses of ranitidine (up to 14 times recommended dose for treatment of peptic ulcer) appeared to have no effect on theophylline elimination in a comparison study with cimetidine. Eight of the 12 healthy adult subjects were smokers. Mean serum theophylline clearances were 48.9±14.6 mL/hr/kg (control), 38.7±12.0 mL/hr/kg (cimetidine, 1,200 mg/day), 48.8±15.7 mL/hr/kg (ranitidine, 1,200 mg/day) and 49.6±14.0 mL/hr/kg (ranitidine, 4,200 mg/day). Whereas large doses of cimetidine decreased theophylline clearance in 11 of 12 subjects by a mean of 19.4 percent ($p=0.001$), neither ranitidine dose affected theophylline disposition. Theophylline clearance was higher in smokers than in nonsmokers (55.06±14.08 vs. 36.48±3.57 L/hr/kg; $p<0.05$). Theophylline clearance after cimetidine treatment was similar in smokers and nonsmokers (17 vs. 24 percent). No adverse effects were attributable to ranitidine or cimetidine during the study.

86–1794. La Vecchia, C.; Pampallona, S.; Negri, E., et al. **Characteristics of Women Undergoing Induced Abortion: Results of a Case—Control Study From Northern Italy.** *Contraception* 32(6):637-649, December 1985.

To identify subgroups of women at elevated risk of induced abortion, personal characteristics and habits, selected medical histories, and contraceptive practices of 873 women undergoing legal abortion in Northern Italy were compared with those of 504 control subjects selected from family planning clinics. Induced abortion was less frequent among ex-smokers and more frequent among heavy smokers. There were 410 smokers among cases and 201 among controls. Of these, 199 cases were heavy smokers (≥ 15 cigarettes/day), compared with 68 controls (relative risk estimate = 1.70); 211 cases were moderate smokers (< 15 cigarettes/day), compared with 133 controls (relative risk estimate = 0.99). The relative risk (RR) for ex-smokers was 0.57 (31 cases, 30 controls). The strongest determinant of legal abortion was frequency of sexual intercourse during the previous 6 months. RR was higher (2.82) in women with less frequent intercourse. Induced abortion was not appreciably influenced by other indicators of lifestyle habits and history of gynecological or psychiatric complaints. The risk of abortion was not strongly influenced by marital status, education, or other indicators of social class, nor was it influenced by number of live births, but it was lower for women older at first birth.

86–1795. Lam, S.-K.; Lau, W.-Y.; Choi, T.-K., et al. **Prostaglandin E_1 (Misoprostol) Overcomes the Adverse Effect of Chronic Cigarette Smoking on Duodenal Ulcer Healing.** *Digestive Diseases and Sciences* 31(2):68S-74S, February 1986.

Chronic cigarette smoking adversely affects duodenal ulcer healing despite treatment by potent gastric acid-reducing agents. Prostaglandins of the E series possess antisecretory and cytoprotective properties, and theoretically offer advantages over existing therapeutic agents. Complete duodenal ulcer healing was assessed by endoscopy every 2 weeks for up to 12 weeks in 229 patients who received misoprostol, an orally stable synthetic derivative of prostaglandin E_1, in 200 or 300 μg doses, q.i.d., or placebo. Life-table analysis showed that misoprostol was significantly more effective than placebo, achieving healing rates at 4 weeks of 61 and 71 percent for the 200 and 300 μg, respectively. Cigarette smoking significantly impaired healing by placebo but not by misoprostol; in fact, time-healing curves of smokers and nonsmokers on the higher dose of misoprostol completely overlapped. Delayed treatment and large ulcer diameter adversely affected healing by misoprostol in smokers, whereas high basal and maximal acid output were unfavorable for nonsmokers. It is recommended that misoprostol be used to treat duodenal ulcer, particularly in chronic smokers early in a given period of symptoms. (Auth. Abs. Mod.)

86–1796. Lauritsen, K.; Laursen, L.S.; Havelund, T., et al. **Enprostil and Ranitidine in Duodenal Ulcer Healing: Double Blind Comparative Trial.** *British Medical Journal* 292(6524):864-866, March 29, 1986.

Of 163 patients treated twice daily with synthetic dehydroprostaglandin E_2 (enprostil 35 μg or ranitidine 150 mg) for up to 6 weeks, smokers had lower ulcer healing rates than nonsmokers. Healing at 2 weeks occurred in 45 percent of smokers and 67 percent of nonsmokers in the enprostil group and in 60 percent of smokers and 82 percent of nonsmokers in the ranitidine group. Duration of treatment was longer in the enprostil group ($p<0.005$), with cumulative healing rates at 2, 4, and 6 weeks of 51 percent, 74 percent, and 85 percent, respectively. In the ranitidine group, corresponding figures were 65 percent ($p<0.04$), 89 percent ($p<0.02$), and 99 percent ($p<0.002$). More patients treated with ranitidine reported relief of pain ($p<0.004$ at weeks 5 and 6). On the basis of the observed superiority of ranitidine over enprostil, the authors question the clinical relevance of using so-called cytoprotection (the capacity of prostaglandins to protect the mucosa by mechanisms independent of acid inhibition) as short-term treatment for duodenal ulcer disease. (Auth. Abs. Mod.)

86–1797. Macular Photocoagulation Study Group. **Recurrent Choroidal Neovascularization After Argon Laser Photocoagulation for Neovascular Maculopathy.** *Archives of Ophthalmology* 104(4):503-512, April 1986.

Cigarette smoking was related to the rates of recurrence of senile macular degeneration (SMD; $p=0.02$) and of idiopathic neovascularization (INV; $p=0.09$) in a study on choroidal neovascularization after argon laser photocoagulation for neovascular maculopathy. Argon laser photocoagulation reduces risk of severe visual loss in eyes with extrafoveal choroidal neovascular membranes secondary to SMD, ocular histoplasmosis (OH), or INV, but has not been entirely successful in permanently eradicating active neovascularization. Recurrent neovascularization in the form of either neovascularization contiguous with the treatment scar or independent neovascular membranes has been observed in 70 of the 119 SMD eyes originally assigned to treatment, 40 of the 132 OH eyes, and 11 of the 33 INV eyes. Recurrence was accompanied by an increased frequency of severe visual loss. Cigarette smoking was the only factor that approached statistical significance ($p \leq 0.10$) for increased risk of recurrence in SMD; both cigarette smoking and treatment extending into the foveal avascular zone were related to recurrence in INV. That smoking has been shown to alter choroidal blood flow and has been associated with vascular disease elsewhere in the body supports the hypothesis that smoking increases the risk of neovascularization.

86–1798. Massarrat, S.; Enschai, F.; Pittner, P.M. **Increased Gastric Secretory Capacity in Smokers Without Gastrointestinal Lesions.** *Gut* 27(4):433-439, April 1986.

Smoking was related to increased gastric secretory capacity in healthy subjects with normal laboratory data and no gastrointestinal lesions. Basal acid output (BAO) and peak acid output (PAO) were determined in 201 men and women (93 smokers) between 25 and 40 years of age; basal and stimulated pepsin outputs were measured in 85. Accuracy of the patients' statements was checked by urinary nicotine assay. Basal acid output and PAO were significantly higher in male smokers than in male nonsmokers. Female smokers had a higher pepsin output than female nonsmokers. Eight variables were considered in relation to BAO and PAO: age, height, weight, alcohol abuse, smoking habits, duration of smoking habit, number of cigarettes smoked/day, and the product of years of smoking multiplied by daily number of cigarettes. The daily number of cigarettes multiplied by years of smoking was most closely correlated with BAO and PAO by stepwise multiple linear regression analysis. (Auth. Abs. Mod.)

86–1799. Matsubara, J.; Ohta, T.; Sakurai, T., et al. **Natural History of Intermittent Claudication in the Japanese.** *Japanese Journal of Surgery* 16(1):42-45, 1986.

The natural history of intermittent claudication (IC) and the role of such risk factors as smoking, hypertension, diabetes mellitus, and hypercholesterolemia were surveyed in 59 limbs of 44 Japanese patients during a 3-year followup period. Patients were divided into those with solitary and those with multiple arterial lesions; patients with iliac and femoropopliteal lesions were considered separately. Analysis of peripheral arterial occlusion disease risk factors indicated that 94.4 percent of males and 75 percent of females smoked >10 cigarettes/day for >20 years. Fourteen of forty smokers and one of four nonsmokers had worsening of symptoms. During the followup, 72 percent of limbs with solitary arterial lesion improved or remained unchanged. Detailed analysis showed that 53.3 percent of limbs with iliac artery stenosis and 50 percent of those with femoropopliteal artery stenosis worsened, whereas only 18.7 percent of limbs with iliac artery occlusion and no limbs with femoropopliteal artery occlusion showed worsening symptoms. Over 62 percent of limbs with multiple arterial lesions had worsened. Although the natural history of IC is relatively favorable, IC due to a solitary arterial stenosis tends to worsen, whereas IC owing to solitary arterial occlusion will, in more than 80 percent of cases, improve or remain unchanged. It is concluded that, in cases of arterial stenosis, careful followup that includes control of risk factors is mandatory. (Auth. Abs. Mod.)

86–1800. Mueller-Lissner, S.A. **Bile Reflux Is Increased in Cigarette Smokers.** *Gastroenterology* 90(5):1205-1209, May 1986.

Cigarette smoking has both chronic and acute effects on gastric function, and bile salt reflux may contribute to increased incidence and lower healing rate of gastric ulcers in smokers. The effect of smoking on gastric emptying, gastric secretion, and bile salt reflux was measured in 19 healthy habitual cigarette smokers (≥ 20 cigarettes/day) and 18 nonsmokers both in a fasting state and after being fed a mixed liquid meal. Smokers, studied in randomized smoking and nonsmoking states, had lower basal gastric secretion rates than nonsmokers irrespective of actually smoking or not. Bile salt reflux and postprandial gastric bile salt concentration were higher in smokers than in nonsmokers even when not actually smoking ($p<0.01$). Smoking during the experiment slowed gastric emptying and increased bile salt reflux rate and gastric bile salt concentration ($p<0.01$). Bile salts have been implicated in injury to gastric mucosa, and increased bile reflux has been found in gastric ulcer patients. It is suggested that an increased reflux of bile salts may partly explain the ulcerogenic effect of smoking. (Auth. Abs. Mod.)

86–1801. Preber, H.; Bergstrom, J. **Cigarette Smoking in Patients Referred for Periodontal Treatment.** *Scandinavian Journal of Dental Research* 94(2):102-108, April 1986.

Smokers appeared to have greater risk of periodontal disease than nonsmokers in a study examining cigarette smoking in patients referred for periodontal treatment. Smoking habits of 369 adult patients with moderate to severe periodontitis were compared with a survey sample of the general population of Stockholm. For men and women combined, 53 percent of patients were smokers compared with 33 percent in the survey sample. The overall mean plaque indexes for smokers (1.49 ± 0.48) and for nonsmokers (1.42 ± 0.56) were not significantly different ($p>0.05$). Smokers of low and moderate cigarette consumption had a mean plaque index of 1.41 and 1.44, respectively. Heavy smokers (≥ 20 cigarettes/day) had a mean plaque index of 1.55 ($p>0.05$). Gingival bleeding was less prevalent in smokers than in nonsmokers ($p<0.001$). Only 19 percent of heavy smokers reported gingival bleeding compared with 39 percent of low consumption smokers. Gingival index for smokers was 1.45 ± 0.34 and 1.54 ± 0.34 for nonsmokers. Gingival scores for bleeding under pressure were 47.2 ± 31.2 percent for smokers, compared with 57.4 ± 31.1 percent for nonsmokers ($p<0.05$). Smokers had a greater overall mean probing depth (4.50 mm) than nonsmokers (4.34 mm) and a greater probing depth for all pocket sites. Probing depth seemed to increase with increasing cigarette consumption in all sites and was most pronounced for maxillary lingual pockets, reaching statistical significance ($t=3.59$, $p<0.001$).

86–1802. Rachmilewitz, D.; Chapman, J.W.; Nicholson, P.A. **A Multicenter International Controlled Comparison of Two Dosage Regimens of Misoprostol With Cimetidine in Treatment of Gastric Ulcer in Outpatients.** *Digestive Diseases and Sciences* 31(2):75S-80S, February 1986.

Tobacco, alcohol consumption, and gender had no statistically significant effects on treatment of gastric ulcer with 50 or 200 μg of misoprostol, or 300 mg of cimetidine, among 628 patients participating in a double-blind, parallel-group multicenter study. At 4 weeks, the healing rates of smokers in the treatment groups were 32 percent for misoprostol 50 μg, 46 percent for misoprostol 200 μg, and 58 percent for cimetidine; healing rates among nonsmokers in the same groups were 54, 60, and 57 percent, respectively. The healing rates of cimetidine and misoprostol 200 μg were similar; both were significantly better than with misoprostol 50 μg dose ($p=0.008$).

86–1803. Rennie, J.S.; Reade, P.C.; Hay, K.D., et al. **Recurrent Aphthous Stomatitis.** *British Dental Journal* 159(11):361-367, December 7, 1985.

Recurrent aphthous stomatitis (RAS), characterized by recurrent persistent oral mucosal ulcers, sometimes occurs in patients who have stopped smoking. Although the cause is unclear, it is possible that the effect of tobacco smoking on oral mucosa, by increasing keratinization, also increases its resistance to minor traumatic incidents. Ulcers in a majority of patients with RAS can be controlled or significantly improved. Management of RAS consists of (1) history and diagnosis; (2) elimination of likely sources of mucosal trauma; (3) investigations for deficiencies; (4) investigations of dietary factors; (5) investigations of hormonal factors; (6) investigations of pyschological factors; and (7) assessment of effect of topical chlorhexidine and then steroid therapy.

86–1804. Riefkohl, R.; Wolfe, J.A.; Cox, E.B., et al. **Association Between Cutaneous Occlusive Vascular Disease, Cigarette Smoking, and Skin Slough After Rhytidectomy.** *Plastic and Reconstructive Surgery* 77(4):592-595, April 1986.

Cigarette smoking appears to accelerate nonreversible occlusive changes in the skin and to contribute to skin slough after rhytidectomy. Dermal microvasculature from 83 consecutive rhytidectomies was evaluated for intimal proliferation and/or hyalin sclerosis. Occlusive vascular disease increased progressively with age in all patients, but smokers and ex-smokers had significantly greater involvement than nonsmokers at any given age ($p=0.03$). Severe occlusive vascular disease was associated with skin slough ($p=0.02$), and there was a strong associative trend between active smoking and skin slough ($p=0.06$). A significant relationship was found between skin slough and failure to abstain from smoking postoperatively ($p=0.006$). There were two skin sloughs among 40 nonsmokers (5 percent), one slough among 12 ex-smokers (8.3 percent), and six sloughs (19.4 percent) among 31 active smokers ($p=0.09$). Four out of six patients (67 percent) in the smoking group with skin slough admitted to smoking against medical counsel at the time of their surgery, whereas only 2 of 25 smokers (8 percent) who abstained from smoking at the time of their surgery had a slough ($p=0.006$).

86–1805. Sinha, A.K.; Linscombe, V.A.; Gollapudi, B.B., et al. **Cytogenetic Variability of Lymphocytes From Phenotypically Normal Men: Influence of Age, Smoking, Season, and Sample Storage.** *Journal of Toxicology and Environmental Health* 17(4):327-345, 1986.

Smokers appeared to have a higher number of chromosomal aberrations than nonsmokers in a cytogenetic study of 60 male volunteers to determine baseline chromosomal changes in nonchemical workers. The influences on lymphocyte mitotic index and chromosomal aberration of blood sample storage prior to culture, donor's age, cigarette smoking, and seasonal variation on lymphocyte mitotic index and chromosomal aberration were analyzed from samples collected quarterly over a year. In nonsmokers, chromosome breaks occurred at mean frequencies of 0.35, 0.48, 0.30, and 0.32 percent in the four quarters. Although the difference was not statistically significant, smokers had a higher incidence of chromosome breaks (0.90 percent) than nonsmokers (0.43 percent) of any age group. The total number of chromosome type aberrations was significantly lower in middle-aged smokers. Miscellaneous anomalies, including endoreduplication, uncondensed chromosomes, chromosomal disintegration, supernumerary chromosomal elements, and chromosomal stickiness, occurred at mean frequencies of 0.55, 0.69, 0.67, and 0.88 percent in the four quarters. Smokers had a mean of 0.60 percent. None of the variables examined had a significant effect on observed frequencies of miscellaneous aberrations.

86–1806. Soffer, A. **Smokers' Faces. Who Are the Smokers? (Letter).** *Chest* 89(5):622, May 1986.

An underrated clinical sign, the smoker's face (*British Medical Journal* 291:1755, 1985), may provide the psychological stimulus for smokers to quit the habit. The condition is described as (1) lines or wrinkles on the face; (2) gauntness of facial features with prominence of the underlying bony contours; (3) atrophic, slightly pigmented gray appearance of the skin; and (4) plethoric, slightly orange, purple, and red complexion. Predictably, women are particularly impressed with this information; however, the impact of this data on men should not be underestimated. I was recently a guest speaker on the dangers of smoking and smoking cessation techniques on a question-and-answer radio program in San Diego. The moderator, a professional announcer and a chain smoker, was singularly unimpressed by my description of the deleterious effects of smoking upon the cardiovascular and pulmonary systems until a listener asked if it were true that smoking caused premature wrinkling and lining of the face. When I replied that her information was entirely correct, the moderator snapped to attention and whispered to me urgently, "Is this really an effect of smoking? If so, I'm going to give it up immediately!" My 50-year-old radio host considered facial wrinkling a more urgent reason for smoking cessation than emphysema, lung cancer, or coronary arteriosclerosis. We as clinicians welcome with gratitude any information that will motivate our patients to stop smoking.

86–1807. Thomas, P.; Fugmann, R.; Aranyi, C., et al. **The Effect of Dimethylnitrosamine on Host Resistance and Immunity.** *Toxicology and Applied Pharmacology* 77(2):219-229, February 1985.

Subacute exposure to dimethylnitrosamine (DMN) altered humoral immunity and antibody-mediated host defense mechanisms in female B6C3F1 mice. Adult mice were injected ip daily with 0.2 mL phosphate-buffered saline (PBS) containing 0, 1.5, 3, or 5 mg DMN/kg body weight for 14 days. On the 16th day, mice were evaluated for changes in immune status as measured by the antibody response to sheep red blood cells, blastogenesis to T- and B-cell mitogens, natural killer (NK) cell function, delayed hypersensitivity and alveolar macrophage (AM) bactericidal activity. DMN-exposed animals exhibited reductions in humoral antibody responses, T-cell mitogenesis, and AM bactericidal activity. B-cell mitogenesis, NK cell activity, and delayed hypersensitivity were increased. Resistance to challenge with *Listeria monocytogenes, Trichinella spiralis,* or Herpes simplex virus types 1 or 2 was not significantly impaired, while that to *Streptococcus zooepidemicus* and influenza virus was significantly reduced. Resistance to B16-F10 tumor challenge was enhanced following DMN exposure. It is suggested that increased NK cell activity may account for the increased resistance to challenge with Herpes virus and B16-F10 tumor cells. (Auth. Abs. Mod.)

86–1808. Webster, R.C.; Kazda, G.; Hamdan, U.S., et al. **Cigarette Smoking and Face Lift: Conservative Versus Wide Undermining.** *Plastic and Reconstructive Surgery* 77(4):596-602, April 1986.

The role of smoking in skin flap viability following face lift surgery is discussed, with particular emphasis on a conservative undermining technique. Clinical and laboratory studies have provided some evidence of direct and indirect effects of smoking on skin flaps. A significant incidence of skin slough has been reported in smokers with use of wide undermining techniques. No cases of skin slough were encountered after conservative bilateral undermining techniques were employed in 407 face lifts (132 smokers, averaging 33 cigarettes/day). It is concluded that limited undermining shortens operative time, uses less local and/or general anesthesia, limits intraoperative bleeding, provides adequate exposure for SMAS and platysmal surgery, and makes a snugger skin closure without the risk of flap necrosis. Results suggest that limited undermining is a safer procedure for smokers than the usually performed more radical procedure. (Auth. Abs. Mod.)

86–1809. Weisberg, E. **Smoking and Reproductive Health.** *Clinical Reproduction and Fertility* 3(3):175-186, September 1985.

Smoking may impact on reproductive function and health through the hypothalamic-pituitary-gonadal axis in both men and women, affecting fertility and sexual function in both sexes and causing menstrual irregularies and pregnancy complications in women. Although epidemiological evidence is scanty, cigarette smoking appears to decrease fertility in women, increase the frequency of menstrual abnormalities, and decrease the age of spontaneous menopause. Cigarette smoking in males may cause decreased sperm numbers, increased frequency of abnormal sperm morphology, and decreased sexual performance. Human and animal experimental evidence suggests that nicotine alters the hypothalamic-pituitary axis through its stimulation of growth hormone, cortisol, vasopressin, and oxytocin release, thereby inhibiting luteinizing hormone and prolactin release. It is recommended that more definitive studies be initiated to study the effects of smoking on reproductive health and upon its mechanisms. (Auth. Abs. Mod.)

86–1810. Wetzig, G.A.; Gough, I.R.; Furnival, C.M. **One Hundred Cases of Arteriovenous Fistula for Haemodialysis Access: The Effect of Cigarette Smoking on Patency.** *Australian and New Zealand Journal of Surgery* 55(6):551-554, December 1985.

Cigarette smokers had an increased risk for both early and late fistula failure in a study of 100 radiocephalic arteriovenous fistulae formed to provide access for hemodialysis in 85 patients with chronic renal failure. First fistulae had an immediate patency of 90.5 percent and a predicted patency at 1 year of 78 percent. An additional 15 fistulae were formed after initial failure in 13 patients. The predicted patency for all fistulae was 76 percent at 1 year and 73 percent at 2 years, with no subsequent failures during the period of study. Access was established and maintained in 90.6 percent of patients using the first or a subsequent radiocephalic fistula; the requirement for other access procedures was low. Overall, 23 fistulae lost patency in 17 individuals: 12 within 24 hours and 11 at a later stage. There was a significant incidence of fistula failure among patients who were cigarette smokers (7 of 22 smokers, 10 of 63 nonsmokers; $p=0.0475$). Of the seven cases of late fistula failure with no apparent cause, five were smokers and two were nonsmokers. The four patients with identifiable causes of late failure were nonsmokers. The uneven distribution is statistically significant ($p=0.0455$). (Auth. Abs. Mod.)

86–1811. Willoughby, J.M.T.; Essigman, W.K.; Weber, J.C.P., et al. **Smoking and Peptic Ulcer in Rheumatoid Arthritis.** *Clinical and Experimental Rheumatology* 4(1):31-35, January-March 1986.

Chronic peptic ulcer was significantly associated with the smoking habit among 152 outpatients with rheumatoid arthritis (RA) compared with matched controls, outpatients with other diagnoses. Twenty-five patients with RA had ulcers compared with 10 controls. There was no evidence that any form of anti-inflammatory treatment increased ulcer risk. The incidence of ulcer among RA patients who smoked 0 to 4, 5 to 19, or >20 cigarettes per day were 7.4, 19.4, and 46 percent, respectively; among comparable groups of controls, ulcer incidence was 8.4, 3.0, and 4.2 percent. Among patient subgroups, the differences were greatest and achieved statistical significance in females, although the overall trend was similar in men. Patients with rheumatoid arthritis should be advised that abstaining from smoking could diminish the high risk of peptic ulceration associated with this disease. (Auth. Abs. Mod.)

See also, **86–1693, 86–1756, 86–1767**

BEHAVIORAL AND PSYCHOLOGICAL ASPECTS

86–1812. American Lung Association. **Survey of Attitudes Towards Smoking.** American Lung Association. Princeton, The Gallup Organization, Inc., GO 85119. July 1985, 59 pp.

Smoking incidence among a national sample of 1,540 adults ≥ 18 years of age surveyed by Gallup in June 1985 was down by 3 percent to 35 percent since April 1983, with a 1 percent increase in the number of ex-smokers. A total of 94 percent of adults agreed that smoking is harmful to your health. Three-fourths agreed that smokers should refrain from smoking in the presence of nonsmokers; specifically, 62 percent cited a public place, 34 percent mentioned a workplace, and 19 percent referred to the home environment. Almost 80 percent thought companies should assign smoking and nonsmoking areas in the workplace. Regarding advertising, 36 percent felt some types should be banned, 32 percent felt all types should be banned, and 31.5 percent felt there should be no ban whatsoever. Nine in ten polled believed that a smoker who dies from lung cancer is primarily responsible for his own death. The Gallup Smoking Audit has been recording incidence figures on smoking at intervals since 1944. The report includes composition and design of the sample, tables of recommended tolerances, and questions asked. (Auth. Abs. Mod.)

86–1813. Baker, B.E. **Of Cigarettes and Sleeping Pills. (Letter).** *New York State Journal of Medicine* 86(2):108, February 1986.

The *New York State Journal of Medicine* (July 1985 issue) was to be donated to a high school library for its wealth of information on cigarette smoking until the back cover advertisement for sleeping pills caught the writer's attention. In some cases, sleeping pills may be a more serious and immediate threat to health than cigarettes. Contrary to cigarette advertising, this advertisement did not carry a "may be dangerous to your health" warning label. Since the *New York Times* has refrained from editorial scrutiny of cigarette advertisers' ethics, is the *Journal* also refraining from editorial scrutiny of the "chemical society's" ethics? Coincidentally, the front cover of "Jeune Afrique" juxtapositioned with a back cover Marlboro cigarette advertisement was reproduced in the same issue to demonstrate advertising irresponsibility. Was the *Journal* subtly making the same point with the sleeping pill advertisement?

86–1814. Biddle, B.J. **Studies of Role Behavior: Implications for Smoking.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 65-71.

Peer norms had greater influence on smoking behavior of high school adolescents than of undergraduate students, and parents were found to have relatively little impact on student expectations for smoking. Three internalized role expectations were studied, i.e., respondents' own norms, preferences, and self-referent labels for smoking, including whether these expectations were tied to norms of peers and parents, and tested against a role behavior model designed to predict smoking behaviors among adolescents. Respondents' self-referent labels and preferences were found to be strong predictors of smoking behavior for both groups, although identity labels were more important for high schoolers and preferences were more influential for undergraduates. In contrast, respondents' own norms for smoking had little impact on reported smoking behaviors. Results suggest that peers have much greater impact than parents on adolescent smoking, and that factors influencing adolescent smoking are not quite the same as those affecting smoking by young adults. It is also suggested that smoking is likely to be initiated as a response to images of what it means to be a smoker and as an attempt to gain acceptance from peers. In contrast, smoking is continued into the young adult years because of pleasures of habit and addiction.

86–1815. Commonwealth (Australia) Department of Health. **Statistics on Drug Abuse in Australia.** Commonwealth (Australia) Department of Health, ISBN 0-644-03943-4. Canberra, Australian Government Publishing Service, 1985, 23 pp.

Of 20,500 deaths caused by drug use among Australians in 1983, 16,600 (81 percent) were attributed to the use of tobacco. Tobacco, alcohol, analgesics, and cannabis are used more commonly among the Australian young than other drugs. In adults, the use of most drugs tends to be decreasing. Consumption of tobacco per person ≥ 15 years has decreased by over 20 percent in the last 10 years from 3,291 grams/person in 1974 to 2,621 grams/person in 1983. Smoking patterns among persons aged 25 to 64 years show declines with the exception of males and females between 25 to 34 years of age: 36 percent of males and 28 percent of females smoked in 1980 and in 1983. Heavy smokers (≥ 21 cigarettes/day) in the younger age group have decreased slightly in number from 34 percent in 1980 to 33 percent in 1983 among males, and from 27 percent to 16 percent, respectively, among females. Smokers between 35 and 64 years of age show greater declines, with 35 percent of males smoking in 1980 compared with 30 percent in 1983. Females in the same age group show only a 1 percent decline, from 25 to 24 percent. The number of heavy smokers dropped from 47 to 44 percent among males, but rose among women from 21 percent in 1980 to 24 percent in 1983. Assuming a normal life expectancy of 70 years, the estimated number of years of life lost in 1983 to deaths caused by drugs was 189,000, of which 45 percent were associated with tobacco, 43 percent with alcohol, 4 percent with narcotics, and 7 percent with other drugs.

86–1816. Coombs, R.H.; Wellisch, D.K.; Fawzy, F.I. **Drinking Patterns and Problems Among Female Children and Adolescents: A Comparison of Abstainers, Past Users, and Current Users.** *American Journal of Drug and Alcohol Abuse* 11(3-4):315-348, 1985.

Deprivation, personal deficiency, hedonistic peer culture, and family pathology were assessed in a study of drinking patterns and problems among 197 young girls, aged 9 to 17. Girls who drank alcoholic beverages tended to smoke (41.0 percent), compared with past drinkers (14.6 percent) and abstainers (3 percent) ($p<0.0001$). Smoking history reflected a similar relationship: 83.3 percent of alcohol abstainers never smoked cigarettes, compared with 43.9 percent of past drinkers and 19.2 percent of recent drinkers. Socioeconomic deprivation, as measured by family income, parental employment, and social class, was not significantly different among comparison groups. Despite the widely held concept that alcoholism is a disease, there was no evidence that young girls who drink have more health deficits than do abstainers. Girls who drink reported less self-satisfaction and appeared to be less happy. Girls who drink were more likely to value having a good time and less likely to attend religious services and value school work. Generally, abstainers were more likely to have satisfying, positive, and encouraging relationships with their parents. It is concluded that positive family environments are critical for the development of healthy attitudes among growing youngsters toward alcohol and other drugs.

86–1817. Corroll, V.A. **An Overview of the Smoking Health Problem in Canada: Status, Cessation, and Prevention.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 171-174.

Cigarette smoking has been targeted as the most preventable cause of illness and death in Canada. The overall decline of smoking from 1965 to 1981 has been attributed to a growing awareness of the health hazards of smoking. However, while the incidence of tobacco smoking by males has decreased, females, especially those aged 15 to 19 years, have shown an increase. The proportion of adult male smokers dropped from 54 to 36 percent, while that of adult female smokers dropped from 32 to 29 percent during the 15-year period. Among adolescents, male smokers 15 to 19 years of age decreased from 35 to 20 percent, while female smokers increased from 20 to 28 percent in 1972, followed by a decrease to 23 percent in 1981. More recent data showed that current smokers constitute 29 percent of males and 34 percent of females 16 to 17 years of age, and 37 percent of males and 46 percent of females 18 to 19 years of age. According to a 1981 survey, 19.1 percent of regular smokers attempted to quit smoking, while 31.3 percent of regular smokers >15 years of age actually quit the habit. Several Canadian cities have legislated against smoking in public facilities. The rights of nonsmokers and the hazards of passive smoking are being recognized, and education on smoking prevention is becoming more prevalent in schools. Recently, Health and Welfare Canada has financed a 20-year multimillion dollar campaign to produce a generation of nonsmokers.

86–1818. Cruz, J.; Wallack, L. **Trends in Tobacco Use on Television.** *American Journal of Public Health* 76(6):698-699, June 1986.

A 2-week composite sample of prime time television programming from fall 1984 was analyzed for portrayals of tobacco and alcohol. Compared with earlier studies that showed progressively declining levels, higher levels were noted. During 115.5 hours of programming, 107 smoking acts were observed (about one smoking act (.93) per hour of programming). Viewers were likely to see approximately one smoking act (1.01) per hour of drama, compared with one for about 3 hours of situation comedies. Almost two-thirds of smokers portrayed were lead characters. Male smokers outnumbered females (3:1); 70 percent were cast in strong and enduring roles. Frequent and routine appearance of smoking characters was considered more important than whether the character was "good"; such characters are often central to plots. The assumption that smokers on television are predominantly "negative" was not supported by the study. Only one observed case attempted to point out that smokers may desire to quit. It is suggested that the increase in smoking acts may be due to programming changes, reflecting the predominance of prime time drama.

86–1819. Dalton, J.A.; Swenson, I. **Nurses and Smoking: Role Modeling and Counseling Behaviors.** *Oncology Nursing Forum* 13(2):45-48, March-April 1986.

Nurses have frequent, direct, and prolonged contact with clients, and are in a position to influence others not to smoke by not smoking themselves. Role modeling beliefs and behaviors of smokers and nonsmokers among a random sample of North Carolina nurses were assessed from questionnaires on personal characteristics and smoking habits. Of 601 responding, 53.4 percent were nonsmokers, 14 percent were ex-smokers, and 32 percent were current smokers (i.e., had smoked during the last year). A higher proportion of never smokers thought that practicing good health behaviors made them better role models, even though they felt nurses have limited or essentially no influence as role models to the general public. Twice as many never and former smokers than current smokers said they counseled patients regularly about smoking. Nurses were more involved in counseling clients than in counseling family members. Of current smokers, 50 percent thought that smoking was a very important cause of lung cancer, compared with 81.6 percent of never and former smokers, and that smoking was a significant cause of health problems, compared with 77.2 percent of never smokers and 83.9 percent of former smokers. Of current smokers, 32 percent thought that smoking was the cause of health problems but "not as much as all the publicity says," compared with 15.6 percent of never smokers and 9.3 percent of former smokers.

86–1820. Dignan, M.B.; Steckler, A.; Block, G.D., et al. **Prevalence of Health-Risk Behavior Among Seventh Grade Students in North Carolina.** *Southern Medical Journal* 79(3):295-302, March 1986.

Data from 386 7th grade students (48 percent male, 65 percent white) surveyed at two sites in North Carolina indicate that black adolescent males had the highest prevalence of alcohol (16 percent) and tobacco (20 percent) use and the lowest knowledge about dangers of such substances. White adolescent males had similarly high alcohol and smoking use rates, but were generally more knowledgeable about consequences of substance use. Girls used less alcohol and tobacco and had higher levels of knowledge and more prudent attitudes. Boys, particularly blacks, were found to be at greater risk than girls of developing patterns of behavior associated with abuse of alcohol and heavy smoking. Smoking was reported by 20.8 percent of white males, 19.2 percent of black males, 19.1 percent of black females, and 15.7 percent of white females. Consumption rates varied from ≤ 4 cigarettes/week (19.6 percent of black males, 11.9 percent of white males, and 13.6 percent of both black and white females) to ≥ 10 cigarettes/week (4.0 percent of white males, 3.9 percent of black males, 1.7 percent of white females, and no black females). Use of smokeless tobacco was reported by 13.5 percent of white males, compared with 3.8 percent of black males, while "sometimes" use of smokeless tobacco was reported for 17.3 percent among white males vs. 7.5 percent for black males and for 6.0 percent among black females. Findings suggest that health education to inform adolescents of dangers of substance use should be specific to cultural and sex groups. (Auth. Abs. Mod.)

86–1821. Flay, B.R. **Psychosocial Approaches to Smoking Prevention: A Review of Findings.** *Health Psychology* 4(5):449-488, 1985.

A review of four generations of research (27 school-based studies) on smoking prevention, particularly psychosocial approaches (social influences and the life/social skills), includes (1) seminal work at the University of Houston that derived the social influences approach on which all subsequent work is based; (2) 7 pilot studies of improved programs at Stanford, Minnesota, New York, and Washington, with one school or classroom per experimental condition; (3) 12 improved prototype studies by these four groups and others, with two or three units randomly assigned to conditions; and (4) 6 studies maximizing internal validity. A major shift in focus is recommended in order to (1) determine program components important for program efficacy; (2) establish conditions under which programs are most effective; (3) determine for whom programs are most helpful; (4) investigate alternative approaches to disseminating successful programs; and (5) compare programs derived from competing theoretical perspectives (with careful assessment of mediating variables presumed to be differentially affected by different treatments). Future studies need to be of the highest internal validity and should include comprehensive measures of presumed mediating variables, program implementation, involvement by the target audience, and target audience characteristics. (Auth. Abs. Mod.)

86–1822. Gentry, E.M.; Kalsbeek, W.D.; Hogelin, G.C., et al. **The Behavioral Risk Factor Surveys: II. Design, Methods, and Estimates from Combined State Data.** *American Journal of Preventive Medicine* 1(6):9-14, 1985.

Behavioral risk factor (BRF) telephone surveys were conducted in 28 states and the District of Columbia from April 1981 through October 1983 to obtain baseline prevalence estimates for risk factors associated with leading causes of death among adults. A supplemental survey was conducted to cover the remaining states (except Hawaii) to provide individual states with national level data for comparison purposes. The complex sampling designs and variable sampling rates among state surveys required computation of sample weights before estimates on a national level could be made. Estimates from combined individual surveys were similar to those obtained from more expensive in-person interviews. The BRF national prevalence estimate of current smokers was 31.5 percent (34.0 percent of men, 29.1 percent of women). This compares closely with the 32.6 percent (36.7 percent of men, 28.9 percent of women) estimated by the 1980 Health Interview Survey. BRF data on other behavioral risk factors considered to be leading causes of death in the United States, i.e., alcohol abuse, obesity, and sedentary lifestyle, are also compared. It is suggested that despite recognized technical limitations, this type of telephone survey can be a practical and affordable source of information both for initially gathering prevalence data and for monitoring trends in prevalence of behavioral risk factors of public health concern. (Auth. Abs. Mod.)

86–1823. Hansen, W.B.; Collins, L.M.; Malotte, C.K., et al. **Attrition in Prevention Research.** *Journal of Behavioral Medicine* 8(3):261-275, September 1985.

Cigarette smokers, alcohol drinkers, and marijuana users are more likely to drop out during longitudinal preventive research than those who do not use the substances, limiting the external validity of such studies. Four standardized tests of selective attrition were conducted on databases from two large-scale research projects. Tests evaluated (1) differences between dropouts and stayers in terms of pretest indices of primary outcome variables (substance use), (2) differences in change scores for dropouts and stayers, (3) differences in rates of attrition among experimental conditions, and (4) differences in pretest indices for dropouts among conditions. For one project, differential rates of attrition among conditions suggested a possible attrition artifact that will interfere with interpretation of outcome results, possibly masking true program effectiveness. Recommendations are made for standardizing reports of attrition and for avoiding attrition through second efforts. (Auth. Abs.Mod.)

86–1824. Hansen, W.B.; Malotte, C.K.; Fielding, J.E. **The Bogus Pipeline Revisited: The Use of the Threat of Detection as a Means of Increasing Self-Reports of Tobacco Use.** *Journal of Applied Psychology* 70(4):789-792, November 1985.

Use of the bogus pipeline, i.e., the threat of biological monitoring, did not enhance self-reporting of cigarette smoking among 1,100 8th and 541 9th graders tested two and four times previously, respectively. Students were put under the bogus pipeline condition through concurrent collection of saliva and questionnaire data, or were allowed to complete the questionnaire with normal guarantees of confidentiality. Students who were asked to provide specimens reacted negatively to the biological monitoring; 11.3 percent of 9th graders and 14.4 percent of 8th graders refused to participate. Among the first cohort of 9th graders, there were no significant differences on three dichotomous measures, (i.e., ever smoking, smoking during last 30 days, and smoking during past 7 days) between those receiving the threat of detection and those not receiving it. In the second cohort, more 8th graders under the bogus pipeline procedures reported having ever used tobacco than those who were asked to give saliva specimens. Differences in 30-day use were not significant, but those in 7-day use approached significance; more controls reported use than those asked to provide specimens. No reasons are given to explain the ineffectiveness of the bogus pipeline.

86–1825. Houston, C.S. **The Sociology of Cigarette Smoking.** *Canadian Medical Association Journal* 134(8):878-879, April 15, 1986.

A review concludes that cigarette smoking will persist until it is considered to be socially unacceptable. When chewing tobacco was a common habit in the 1920s, cancer of the tongue and mouth was the fifth most prevalent cancer. As spitting was associated with the spread of tuberculosis, it became socially unacceptable. The death rate from cancer of the tongue decreased from about 60 per million in 1911 to about 1 per million in 1971. During World War II, when smoking was socially acceptable, 72 percent of men smoked; 40 years later, war veterans who continue to smoke are in the minority. Recent surveys indicate that the average smoker smokes more cigarettes/day than the average smoker of previous years, has a less prestigious job, makes less money, and is less educated than the average nonsmoker. Cigarette smoking is increasingly the preserve of the disadvantaged, of the less educated, of alcohol abusers, and of native North Americans. A 1969 Ontario survey found the smoking rate to be 92 and 95 percent among male and female alcoholics, respectively. In a 1982 survey of the Northwest Territories, the smoking rate among Inuit girls and boys aged 15 to 19 years was 61 and 55 percent, respectively. Twenty-five percent of Inuit boys aged 10 to 14 years were using chewing tobacco and snuff. Smoking rates among Inuit men and women were 81 and 93 percent, respectively, and are still increasing.

86–1826. Jensen, R.G. **The Effect of Cigarette Smoking on Army Physical Readiness Test Performance of Enlisted Army Medical Personnel.** *Military Medicine* 151(2):83-85, February 1986.

Male and female nonsmokers had higher average total and individual event scores than smokers in a study of short-term cigarette smoking effects on general physical fitness measured by the Army Physical Readiness Test (APRT). In a sample of 54 enlisted medical company personnel divided into six subgroups (smokers, ex-smokers, and nonsmokers by sex), male smokers averaged more than 2 minutes longer finishing a 2-mile run even though they were generally younger than the male nonsmokers. Results were similar for female smokers and nonsmokers. An even more dramatic difference in raw scores was found between subgroups regarding total points scored: all subgroups exceeded the required minimum of 180 total points, but nonsmokers scored an average of 32 to 35 more points than their gender counterparts who smoked ($p<0.05$). The results cannot be considered as positive proof that an inverse relationship exists between cigarette smoking and physical fitness because of limitations such as sample size and a number of assumptions and uncontrolled variables. However, given the military's present emphasis on personal physical fitness as a critical element of readiness, results demand a more comprehensive and complete investigation. (Auth. Abs. Mod.)

86–1827. Johnston, L.D.; O'Malley, P.M.; Bachman, J.G. **Drug Use Among American High School Students, College Students, and Other Young Adults. National Trends Through 1985.** U.S. Department of Health and Human Services, Public Health Service, National Institute on Drug Abuse, DHHS Publication No. (ADM)86-1450, 1986, 237 pp.

Tobacco, the substance most frequently used on a daily basis among high school seniors, increased in daily usage by 0.8 percent to 19.5 percent for seniors in 1985. Among young adult high school graduates aged 19 to 26, the 1985 daily rate dropped 0.5 percent to 25.9 percent. Among college students, the daily rate also dropped 0.5 percent to 14.3 percent. A significant sex difference in smoking rates was found among college students. Daily smoking among females was 17.5 percent vs. 10.0 percent among males, a difference much larger than that observed among high school seniors (21 percent, females, vs. 18 percent, males) or among young adults generally (27 percent, females, vs. 25 percent, males). Some 30 percent of high school seniors smoked cigarettes in the month prior to the survey and 20 percent reported being daily smokers. Among young adults 19 to 27, 26 percent reported being daily smokers, with 21 percent smoking ≥ 10 cigarettes/day. One in twenty high school seniors in 1985 smoked marijuana daily, a prevalence similar to that of young adults aged 19 to 27. The report, the ninth in an annual series on drug use and related habits of America's high school seniors, covers classes of 1975 through 1985. Data are collected from 125 to 140 public and private high schools selected to accurately provide a cross-section of high school seniors throughout the United States. Drug use among young adults 19 to 27 who have completed high school was incorporated into the survey for the first time in 1985.

86–1828. Kaufert, J.M.; Rabkin, S.W.; Syrotuik, J., et al. **The Impact of Health Beliefs on Smoking Cessation: A Randomized Trial of Alternate Intervention Programs.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 225-228.

The impact of health beliefs on alternate modalities of smoking cessation were examined in a comparison of three intervention programs (hypnosis, health education, and behavior modification) selected for their contrasting cognitive and pedagogical approaches. Self-reported measures of change obtained from pre- and post-intervention questionnaires indicated that intervention groups had a significant ($p<0.05$) reduction in reported cigarette consumption, but the control group had a small, nonsignificant increase ($p<0.05$). Significant correlations between changes in serum thiocyanate and measures of general health concern ($p<0.01$) and perceived vulnerability ($p<0.05$) were found for the health education group. There were no significant correlations among measures of smoking behavior for any group, with one exception: likelihood of taking preventive action in the hypnosis group. There were no significant correlations between health belief scales and changes in cigarette consumption in the control or behavior modification groups. It is suggested that the reliability of specific items in the health belief questionnaires and the overall validity of current formulations of the model itself be reevaluated, and alternate, less deterministic formulations be developed.

86–1829. Klaukka, T.; Riska, E.; Kimmel, U.-M. **Use of Vitamin Supplements in Finland.** *European Journal of Clinical Pharmacology* 29(3):355-361, 1985.

Increased vitamin use among Finnish adults >30 years of age in the late 1970s was significantly related to cessation of smoking and other factors of a healthier lifestyle among men, but to somewhat less healthy lifestyle behavior among women. Data from three nationwide health surveys (1968, 1976, and 1978 to 1980) revealed that a high rate of nonprescribed vitamins were consumed by men who followed a healthful diet (11 percent), who exercised regularly (13 percent), who had quit smoking (10 percent), and who had their teeth checked at least once a year (14 percent). Among women, a high rate of nonprescribed vitamins was consumed by those who frequently drank an intoxicating amount of alcohol (24 percent), who had their teeth examined at least once a year (21 percent), and who either smoked regularly (34 percent) or had given up smoking (17 percent). Multivariate logistic stepwise regression analysis showed that among both men and women, with other factors standardized, the use of nonprescribed vitamins was significantly associated with education and place of residence ($p<0.001$). Vitamin-taking by men was significantly ($0.001<p<0.01$) related to the smoking habit and healthiness of diet, and among women to frequency of dental checkups ($p<0.001$) and occurrence of psychiatric symptoms ($0.01<p<0.05$). Smoking habits of nonprescribed vitamin users showed that more females (17 percent) than males (6.5 percent) smoked 1 to 20 cigarettes/day, and more females (17.4 percent) than males (5.4 percent) smoked >20 cigarettes/day. More females (17.4 percent) than males (9.8 percent) reported stopping smoking.

86–1830. Loysen, E.; Silman, A. **Dangerous Smoke Signals.** *Nursing Times* 82(3):42-43, January 15, 1986.

Nurses continue to smoke despite decreasing cigarette consumption in other professional groups. The proportion of nurses who smoke increases through their early years of training. Studies show that nurses who smoke have more sickness absence than those who do not smoke. The risks of smoking are reviewed. The four major toxic constituents of tobacco smoke are nicotine, tar, carbon monoxide (CO), and irritants. Nicotine increases the heart rate to ≥20 percent after the first cigarette of the day, and the alteration of normal heart rate may be the link between cigarette smoking and ischemic heart disease. Tar contains chemicals that have induced cancer in animals and may be the link between cigarette smoking and cancer of the bronchus. Inhaled CO from a cigarette has impaired capacity for exercise in normal people, and small concentrations (50 ppm) have impaired exercise capacity in patients with angina. Irritant substances are mainly responsible for increased risk of chronic bronchitis in smokers. Cigarette smoking may increase fatty acid concentrations in the blood, leading to formation of atheroma of the arteries. Cigarette smokers have more chest problems than nonsmokers, with persistent cough and sputum production, and recurrent breathlessness on exertion. Acquired immunity to respiratory infections is shortened in smokers. Gingivitis, dental calculus, and loss of teeth are more common in smokers. Bladder and cervical cancers are increased and healing in peptic ulcer is delayed by smoking.

86–1831. Marks, J.S.; Hogelin, G.C.; Gentry, E.M., et al. **The Behavioral Risk Factor Surveys: I. State-Specific Prevalence Estimates of Behavioral Risk Factors.** *American Journal of Preventive Medicine* 1(6):1-8, 1985.

Nine of the ten leading causes of premature death in the United States can be linked to one or more of six behaviors: cigarette smoking, alcohol misuse, lack of exercise, failure to wear seat belts, overeating, and failure to adequately control hypertension. The Behavioral Risk Factor Survey is the initial step toward the analysis of state-specific baseline risk factor data for use in developing programs aimed at reducing leading causes of death in the United States. Since 1981, 28 states and the District of Columbia have completed surveys using standard questionnaires developed by the Centers for Disease Control. Results indicate that current cigarette smoking ranges from a high of 37.7 percent in North Carolina, to a low of 22.1 percent in Kansas, and 31.5 percent of adults from the combined data set are currently smoking. Geographic patterns for smoking were not discernible. Rates for chronic heavy drinking ranged from 3.7 percent in West Virginia to 14.8 percent in New Hampshire. Acute heavy drinking ranged from a low of 9.3 percent in Arkansas to a high of 30.9 percent in Michigan. State rates of sedentary lifestyle ranged from 5.3 percent in Iowa to 17.6 percent in New Jersey. Uncontrolled hypertension ranged from a low of 2.0 percent in Iowa to 6.1 percent in Alabama and the District of Columbia. In general, states with highest prevalences of hypertension were those in southeastern United States. State-to-state variations are also given for drinking and driving, seatbelt use, and overeating.

86–1832. Matarazzo, J.D.; Weiss, S.M.; Herd, J.A., et al. (Editors). **Behavioral Health. A Handbook of Health Enhancement and Disease Prevention.** A Wiley-Interscience Publication. New York, John Wiley and Sons, 1984, 1292 pp.

Behavioral Health, a collection of the most significant behavioral and biomedical findings on disease prevention and health enhancement by the most prominent researchers in this field, examines complex links between behavior and health, social and cultural factors involved in health promotion, and behavioral health issues by lifecycle stages, i.e., prenatal, neonatal, adolescence, adulthood, and advanced age. Chapters focusing on smoking are Behavioral Health: A 1990 Challenge for the Health Sciences Professions; The Relationship Between Cigarette Smoking and Body Weight: A Health Promotion Dilemma; and chapters in Section 6 on Smoking Prevention: An Overview; Review of Approaches to Smoking Treatment: Behavior Modification Strategies; Pharmacological Approaches to Smoking Modification; Review of Techniques for Measurement of Smoking Behavior; Restricted Environmental Stimulation Therapy (REST); A Social Inoculation Strategy to Deter Smoking in Adolescents; and Public Policy and Smoking Prevention: Implications for Research. Other chapters focus on exercise, diet, blood pressure, dental health, household and auto safety, and the prevention of alcohol abuse. Health facilities and organizations devoted to health maintenance are surveyed, and current health professional training is examined. Recommendations are made for more effective education of psychologists, nurses, physicians, dentists, dieticians, nutritionists, and health educators.

86–1833. Mitic, W.R.; McGuire, D.P.; Neumann, B. **Perceived Stress and Adolescents' Cigarette Use.** *Psychological Reports* 57(3,Part 2):1043-1048, December 1985.

Students who are heavy smokers perceive greater levels of overall stress than lighter smokers or nonsmokers. A total of 1,684 students, 866 boys and 818 girls in 7th through 12th grades, were surveyed on cigarette use and types of circumstances perceived stressful. Smoking status was classified as none (639 boys, 509 girls), light (88 boys, 122 girls), medium (100 boys, 139 girls), or heavy (20 boys, 30 girls) use, while overall stress levels were low, medium, or high. Among males, nonsmokers had lower overall mean stress scores than all others ($p \leq 0.05$), while heavy users had greater perceived stress scores than all other categories ($p < 0.05$). Among girls, regular and heavy users reported higher overall stress scores ($p < 0.05$) than either nonsmokers or occasional users; there were no differences ($p > 0.05$) in overall mean stress scores between nonsmokers and occasional users or between regular and heavy users. Factors causing the highest levels of perceived stress among male smokers were schoolwork, money, and parents. Among female smokers, stress was caused by personal appearance, parents, and money. Although smokers obtained significantly higher perceived subscale stress scores in a number of areas, the greatest mean differences among boys existed in areas of money (0.74), health (0.40), and parents (0.37). For girls, the greatest mean differences between smokers and nonsmokers existed in areas of money (0.74) and parents (0.64).

86–1834. Murdaugh, C.; Hinshaw, A.S. **Theoretical Model Testing to Identify Personality Variables Effecting Preventive Behaviors.** *Nursing Research* 35(1):19-23, January-February 1986.

The impact of perceived barriers and benefits and health value orientations on two health care activities, smoking and exercise, was examined to test a preventive behavior model. Data from 76 persons (19 current smokers) in a health screening program were analyzed using regression analysis. A reduced empirical model for exercise resulted, explaining 46 percent of the variance. One variable, pack-years smoked, accounted for 7 percent of variance, and was significant in explaining smoking behavior ($p < 0.04$). Significant personality variables in the exercise model may provide clues toward understanding psychological factors operating to influence an individual's participation in health care activities. (Auth. Abs. Mod.)

86–1835. Newcomb, M.D.; Maddahian, E.; Bentler, P.M. **Risk Factors for Drug Use Among Adolescents: Concurrent and Longitudinal Analyses.** *American Journal of Public Health* 76(5):525-531, May 1986.

Associations between risk factors and substance use were examined for a sample of 994 high school students. Ten risk factors that assessed numerous important personal and social areas of life were defined: low grade point average, lack of religiosity, early alcohol use, low self-esteem, psychopathology, poor relationship with parents, lack of social conformity (deviance), sensation seeking, perceived peer drug use, and perceived adult drug use. These factors were found to be associated with ever using, frequency of use, and heavy use of cigarettes, alcohol, cannabis, and hard drugs. All substances increased in frequency of use by increasing number of risk factors up to six; between six and seven risk factors, cigarette use was decreased slightly, but this was not evident for the other drugs. Few effects were noted for nonprescription medication. No sex differences were evident for number of risk factors. The number of different risk factors was predictive of increases in use of all types of substances over a 1-year period, after controlling for initial level of use. Findings suggest that a risk factor model of substance use is not unlike other epidemiological entities that follow patterns of vulnerability and susceptibility due to increased exposure to risk, as evident in studies of depression, heart disease, lung cancer, problem behavior in children, and mental illness. (Auth. Abs. Mod.)

86–1836. Nolte, A.E.; Smith, B.J.; O'Rourke, T. **Improving Anti-Smoking Education: Profiling the Ex-Smoker.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 239-246.

Young ex-smokers were found to differ significantly in attitude and behavior from current smokers or never smokers in a study focusing on smoking habits of schoolchildren in kindergarten through 12th grade. Ex-smokers were more likely than never smokers, but less likely than smokers, to have close friends who smoke. For all grades, ex-smokers were more likely than never smokers, but less likely than smokers, to have a parent who smokes, or to have parents who would be upset if their child smoked. Ex-smokers had less pronounced beliefs than never smokers that smoking is a health problem, and were less likely than smokers to report that family and friends enjoy smoking, that smoking helps people to relax, or that smoking is socially acceptable. Data on grade, sex, and smoking behavior for 5,393 students revealed that between 7th and 12th grades the percentage of never smokers decreased but the percentage of smokers and ex-smokers increased. About 21.4 percent of 7th grade males reported being ex-smokers, compared with 39.5 percent in the 11th grade and 31.1 percent in the 12th grade. Overall, 29.3 percent of males classified themselves as ex-smokers. For females, the percentage of ex-smokers ranged from 14.9 in 7th grade to 33.6 in the 12th. The ex-smoker group (27.3 percent) was nearly twice as large as the smoking group (15.3 percent).

86–1837. Prochaska, J.O.; DiClemente, C.C.; Velicer, W.F., et al. **Predicting Change in Smoking Status for Self-Changers.** *Addictive Behaviors* 10:395-406, 1985.

Fourteen different measures were investigated as predictors of change in smoking status for self-change efforts at smoking cessation. Subjects, 866 adults, were classified into five stages of change: precontemplation, contemplation, action, maintenance, and relapse; they were assessed on 10 change processes, self-efficacy, temptation to smoke, and their decisions weighing the advantages and disadvantages of smoking. These 14 variables were used as predictors of change in smoking status 6 months later. Six significant functions were found that predicted movement for each of the stages. These predictors are of both theoretical interest and practical significance because they may be modified in self-change efforts to overcome addictive behaviors. The change processes of self-reevaluation and the helping relationship, self-efficacy, and decisional balance were the best predictor variables. A general pattern emerged in which processes oriented more toward environmental events, such as dramatic relief and social liberation, tended to predict failure or no progress, while more experientially oriented processes predicted progress. (Auth. Abs. Mod.)

86–1838. Schwarz, W. **Conditions for Developing and Preventing the Smoking Habit in Childhood.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 261-265.

Parental smoking patterns, parent-child concordance, and peer approval were found to be important social influences for smoking initiation and habituation, according to a study of 400 9th graders and their parents. A significant correlation was found between smoking habits of parents and of boy pupils, but not for girls. Awareness of cigarettes during a child's first 5 years was associated with mother's smoking, but onset of smoking at a later age was influenced by father's former smoking behavior. Pupils' smoking status was also related to degree of agreement between children and parents toward everyday life problems. Pupils who smoked were less adult-oriented and more peer-oriented. Healthy attitudes toward learning deteriorated with smoking status among boys, but showed no such correlation among girls. Adult-oriented children tended to be less popular, although prestige and achievement were higher in nonsmokers. Findings suggest that smokers are less likely than nonsmokers to agree with their parents or to derive their prestige from fulfilling scholastic tasks, but are more ready to join a group against authority opinion. Smokers tend to make their own rules, whereas nonsmokers adapt themselves to adult rules.

86–1839. Young, T.L.; Rogers, K.D. **School Performance Characteristics Preceding Onset of Smoking in High School Students.** *American Journal of Diseases of Children* 140(3):257-259, March 1986.

Smoking in high school was significantly related to low grade point averages during elementary school years, high absentee rates, and low achievement test scores. Data collected from 1,442 high school students (60 percent from the same elementary school system) revealed that 85 percent of the 338 smokers began smoking at 12 years of age or later. The proportion of heavy smokers increased with age. A higher percentage of female current smokers was statistically significant at each high school grade level ($p < 0.05$). IQ scores in the 3rd grade were not significantly different between pupils who became smokers in high school and those who did not, but 6th grade IQ scores of eventual smokers averaged 4.2 points below those of eventual nonsmokers. Absenteeism was found to be more prevalent among smokers of both sexes beginning as early as 2nd grade. Heavy smokers tended to be absent more than light smokers and early onset smokers more than late onset smokers. Although smokers demonstrated these performance characteristics prior to beginning smoking, the differences were not large enough to predict which elementary school students would become high school smokers. Findings support the view that smoking and these school-related characteristics may both be part of the "smoker lifestyle." (Auth. Abs. Mod.)

See also, **86–1714, 86–1755, 86–1791, 86–1841, 86–1863, 86–1918**

SMOKING PREVENTION AND INTERVENTION

86–1840. Aaro, L.E. **The Smoking and Health Programme of WHO Regional Office for Europe.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 59-64.

Faced with estimates that 10 million Europeans may die from smoking by the year 2000, the European division of the World Health Organization (WHO EURO) is developing a strategy to decrease the prevalence of smoking and the volume of tobacco consumed in European countries. The strategy consists of (1) health education of the general public and selected target groups, (2) bans on advertising of tobacco products, (3) bans on selling or supplying tobacco products to young people, (4) health warning labels on tobacco products, (5) restrictions on smoking in public places and the workplace, (6) price increases of tobacco products, (7) smoking cessation clinics, and (8) substitutes for tobacco crops and industries. It is projected that by the end of the century, tobacco consumption will be reduced by 50 percent in countries with a well-developed antismoking program. The smoking program of WHO EURO includes conducting studies, developing guidelines for smoking control, and arranging workshops in collaboration with research institutions and smoking control organizations in member countries. WHO EURO also conducts surveys on smoking and health in different parts of Europe annually and is in the process of examining health behavior of schoolchildren in seven countries. Statistics show that 41.2 percent of all adults smoked in 1980 compared with 48.3 percent in 1960; however, those who continue to smoke consume more tobacco.

86–1841. Bittoun, R. **An Australian Marlboro Man.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 73-74.

A nationwide search for the Marlboro man of Australia, an advertising campaign promoted by Philip Morris (PM), collapsed in ridicule following a low-budget counteradvertising blitz by antismoking activists. The PM competition sought someone with a "strong and distinctly individual masculinity" and offered substantial prize money to the winner. Concerned with findings that Marlboro was the preferred brand among adolescents and had total recall of advertising for 10- and 11-year-old children, a group of Sydney health workers entered a photograph of a willing patient who, for many years, smoked through his tracheotomy tube. Funding for printing 10,000 posters mimicking the Marlboro man format was provided by BUGA-UP, a well-known group of activists against cigarette promotion. The posters became immediately popular among children and adolescents, and resultant sales quickly recouped the initial expenditure. The counteradvertising effort not only ridiculed the Marlboro man image, but also forced the tobacco company to conduct its award presentations in secret. The success of the campaign to foil PM's tobacco promotion is attributed to (1) its legality; (2) effective distribution and widespread coverage; and (3) its black humor and the element of surprise.

86–1842. Branson, D. **Smoking: The Case for Advising a Patient to Stop.** *British Dental Journal* 160(1):21, January 11, 1986.

The case for advising a patient to quit smoking is reviewed and intervention guidelines for dentists are offered. Dentists hold a unique position in the health team since they routinely treat fit, healthy patients. A 1984 survey of 391 U.S. dentists found that 71 percent advise smokers to stop, but only a few provided suggestions, self-help packages, and followup sessions. A large-scale study estimated that general practitioners in the United Kingdom could influence cessation in half a million smokers per year. The rate of success is greater if the advice is accompanied by a leaflet and the warning of a followup. Other surveys indicate that 67 percent of patients who smoke expressed interest in trying to stop. It is suggested that having a respected practitioner as an ally could provide the necessary impetus to try to give up smoking. Two successful approaches to smoking intervention are described: "Want to Quit Smoking? Ask Us for Help!" of the U.S. Air Force Wilford Hall dental services and the Five Day Plan to Stop Smoking of the National Society for Nonsmokers.

86–1843. Burnham, H.A. **Moliere and the Smoking Pandemic. (Letter).** *New York State Journal of Medicine* 86(2):108-109, February 1986.

A medical profession boycott of all medical journals and health magazines owned by the *New York Times* publishing corporation due to their acceptance of tobacco advertisements could have a sobering effect on revenues derived from these sources (*New York State Journal of Medicine*, July 1985). On another issue, a deliberately false impression was made in the April 14, 1984, editorial commentary in the *Medical Journal of Australia*, as noted in the *Journal*, on the antismoking movement in one particular reference to Moliere. In analyzing the full quotation from "Don Juan," it is clear that Moliere was expressing the idea that despite what Aristotle and other learned persons associated with "Philosophie" (such as physicians) may say against it, tobacco is the plaything of ordinary people, and he who does not live without tobacco is not worthy of living. It must be remembered that tobacco was one of the latest fads in the time of Moliere, and that he excelled at pointing out foibles of society and the ridiculous behavior of people trying to keep up with latest fads. The statement does not mean that Moliere promoted tobacco (as suggested in the editorial). Moliere's full quotation indicates that there are people who will attempt to use tobacco no matter what learned philosophers then, and physicians today, may say to dissuade them.

86–1844. Canadian Task Force on the Periodic Health Examination. **The Periodic Health Examination: 2. 1985 Update.** *Canadian Medical Association Journal* 134(7):724-727, April 1,1986.

A Canadian Task Force recommended that the periodic health examination of a person who smokes include counseling for smoking cessation, because (1) more than 70 percent of Canadians see a physician at least once a year, enabling a potential 6 to 8 million persons annually to be reached by physician intervention; (2) sustained cessation rates of at least 5 percent have proved to be attainable when general practitioners offer routine, minimal advice to quit smoking and results are enhanced with followup; (3) nicotine chewing gum has been developed as a pharmacologic aid to alleviate withdrawal symptoms of smoking cessation; (4) hypnotherapy, acupuncture, and aversive conditioning have not proved to be more effective than simple antismoking counseling sustained over periods longer than 1 year; and (5) counseling by physicians of pregnant women and patients with smoking-related diseases has resulted in high cessation rates. A discussion of the current burden of smoking addresses the health effects of smoking and trends in smoking behavior. Research priorities are suggested.

86–1845. Colditz, G.A. **Evaluation of a Smoking Cessation Programme. (Letter).** *International Journal of Epidemiology* 15(1):142-143, March 1986.

An evaluation of a smoking cessation program is discussed: costs of six visits to a general practitioner were compared with costs of medical treatment for a cigarette-related disease (*International Journal of Epidemiology* 14:396-441, 1985). "A cigarette-related disease" is not defined, nor are dollar estimates for these diseases given. Such dollar estimates should be adjusted for expending in the future, in contrast to the 106 dollars expenditure in current dollars/patient in the program. Given an attributable success rate of 30 percent (33 percent on treatment minus 3 percent in the control group), a marginal cost of 353 dollars/patient ceasing smoking can be estimated. Unpublished data from the American Cancer Society's 25-state cancer prevention study suggest that the benefit of quitting smoking (based on mortality rates) shows a range in life-years saved from 5.1 years (male, aged 35 to 39 years) to 1.9 (male. aged 60 to 64 years); for women, the benefit of quitting ranges from 3.2 to 1.4 years for the same age groups. In this context, the described program would have a cost-effectiveness ranging from 70 dollars/life year saved for 35- to 39-year-old males, to 185 dollars for males aged 60 to 64 years. Such figures compare favorably with treatment of moderate hypertension in men aged 40 to 50 years, estimated to require 6,260 dollars/life (1976 U.S. dollars). Treatment of men with serum cholesterol greater than 265 md/mL has been estimated to cost 126,000 dollars (1984 U.S. dollars) for every additional year of life expectancy. More emphasis should be placed on general practice smoking intervention programs than on more traditional therapies to prevent cardiovascular disease.

86–1846. Commonwealth of Pennsylvania. **Guide to Health Data for Pennsylvania.** Harrisburg, Commonwealth of Pennsylvania, Department of Health, H106.814P. State Health Data Center, June 1986, 127 pp.

The Guide to Health Data for Pennsylvania focuses on sources for quantitative data for the health professional, includes references to consumer guides to health topics, and lists clearinghouses that distribute a wide variety of health information. The Office on Smoking and Health, Rockville (MD) is listed as the smoking information source that primarily serves the health professional engaged in scientific research, but will respond to any inquiry on a first-come-first-served basis subject to staff and resource limitations. Publications listed are (1) State Legislation on Smoking and Health, published biennially; (2) State and Local Programs on Smoking and Health, published periodically; (3) Smoking and Health Bulletin, published six times/year; (4) Bibliography on Smoking and Health, published annually; and (5) Directory of Ongoing Research, published biennially. Services include response to written and telephone inquiries, on-line bibliographic searches, and reproduction of articles listed in the Smoking and Health Bulletin.

86–1847. Conover, R.D. **California Division, American Cancer Society: Two Decades of Smoking Control.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 81-84.

The past two decades of the antismoking program of the American Cancer Society's California division are briefly reviewed. Educational programs that involve audience participation have been conducted at the workplace and in and out of the school environment. Some of these are Cancer Education Week, Conquest of Cancer workshops for teachers, The Great American Smokeout, Biology of Cancer workshops for university students, the Pathology Museum, and The Magic Movie Machine van for films on smoking health risks. Special media events include health fairs and exhibits. The agency has been among the leaders in the use of smoking cessation programs, e.g., Stop Smoking Program, and has actively supported laws banning cigarette commercials from radio and television, regulations against distribution of free cigarettes for sales promotion, local ordinances controlling smoking in the workplace and in enclosed public places, and federal tax increases on cigarettes. Some lessons learned over the past two decades have been (1) involving other agencies in the antismoking struggle; (2) recognizing and encouraging the gradual public shift away from smoking and toward increasing public respect for the rights of nonsmokers; (3) linking laboratory and field research in behavioral sciences to public education; and (4) building a statewide support system of citizens informed on upcoming legislative issues of public health.

86–1848. Dean, A.G.; Shultz, J.M.; Gust, S.W., et al. **Minnesota Plan for Nonsmoking and Health: Multidisciplinary Approach to Risk Factor Control.** *Public Health Reports* 101(3):270-277, May-June 1986.

In 1981, when the Minnesota Department of Health began a long-term program to control risk factors for the major health problems of the State, smoking was regarded as the most important problem. Methods chosen to initiate programs were social, economic, and epidemiologic background research and a multidisciplinary statewide planning process. During 1983 to 1984, department staff members analyzed the epidemiology and economics of smoking in Minnesota and reviewed the literature on methods of smoking control. A multidisciplinary technical committee prepared a coordinated plan to increase the prevalence of nonsmoking in Minnesota; recommendations included addressing mass communication and marketing, educational programs in schools, public and private regulation, economic disincentives through taxation, and funding of programs and evaluation of results. The Minnesota Plan for Nonsmoking and Health was released in September 1984. During the first 6 months, the plan provided for the formation of a coalition of health organizations to promote nonsmoking. In June 1985, the Minnesota legislature passed the Omnibus Nonsmoking and Disease Prevention Act, providing 4 million dollars over 2 years for promotion of nonsmoking through education, regulation, and public communications, and slating intervention activities to be funded partially from a 5-cent increase in cigarette excise tax. (Auth. Abs. Mod.)

86–1849. Egsmose, T. **Actions to Control Smoking.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 85-88.

Smoking control in Denmark failed to become law (1970, 1981) owing to changes in government, and currently relies on a gentlemen's agreement between the Danish Government and the tobacco industry that is essentially ineffective for lack of any restraint on tobacco industry budgets for advertising and sales promotion. Tobacco companies have refused to accept scientific findings that tobacco presents a serious health hazard and continue their intensive marketing and advertising activities, spending increasing amounts of money. It is suggested that funds equal to that spent on tobacco advertising be spent on health education. With proper funding, advertising agencies could devote equal energy to health education and the prevention of smoking. If the Government does not provide funds for such advertising, private agencies are unlikely to initiate such an activity. It is suggested that when smoking control finally comes about, it should concern not only tobacco companies' advertisements and sales promotion activities, but also rules and regulations to protect nonsmokers from passive smoking. It is concluded that restrictions on tobacco are long overdue in Denmark.

86–1850. Hardes, G.R. **The Hunter Region Childhood Smoking Prevention Program.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 209-213.

Well-enforced legislation banning cigarette advertising and sales of cigarettes to children, coupled with carefully tailored health education programs, could lead to a substantial reduction of smoking in children aged 10 to 12 years. Effectiveness of smoking prevention strategies was assessed in the Hunter Region Childhood Smoking Prevention Study (HRCSPS) of 6,500 primary school children. In order of importance, factors correlated with adoption of cigarette smoking were (1) associating with an older cohort; (2) having friends who smoke; (3) having siblings who smoke; (4) approving advertising; and (5) having more money to spend weekly. Factors relating to quitting were (1) having siblings who did not smoke; (2) associating with a younger cohort; (3) disapproving advertising; and (4) having less money to spend weekly. It was found that poorly implemented smoking prevention programs led to an increase of smoking among younger boys, that favorable attitudes toward cigarette advertising strongly predisposed young children toward future adoption of smoking, and that advertising campaigns and resources far outweighed those of public health education programs. The HRCSPS recommended that (1) legislation banning cigarette advertising counter predisposing and reinforcing effects of media campaigns on children; (2) legislation be strictly enforced and strengthened to make cigarettes less readily available to children; and (3) health education programs be carefully tailored for intended audiences.

86–1851. Knapp, J.; Silvis, G.; Sorensen, G., et al. **Clean Air Health Care. A Guide to Establish Smoke-Free Health Care Facilities.** Minneapolis, University of Minnesota, Department of Medicine, 1986 32 pp.

Adoption of a smoking control policy for a health care institution requires that the facility (1) decide that the policy is appropriate and should be part of its agenda; and (2) implement the policy once it has been adopted. Part 1: Setting the Agenda, demonstrates that a smoke-free hospital is legal, feasible, and desired by a majority of patients and employees. These questions are addressed: Is a smoke-free hospital realistic? Should we be concerned about losing patients? Will our employees resign? What about our patients who are addicted to nicotine? How can we refuse our dying patients' requests to smoke? Would a smoke-free policy be a burden on staff to enforce? Cannot employees and patients resolve smoking conflicts among themselves? Is smoking really a health problem? Does smoking affect our patients' recovery? Is passive smoke any more than a nuisance? Is not smoking a first amendment right? Will we be sued? Can we restrict patient smoking? Can we refuse to hire smokers? Will unions allow us to restrict smoking among employees? How much will it cost to become smoke-free? Part 2: Implementation, is a practical guide to developing and adopting a smoke-free policy in 10 steps that involves (1) researching the smoking issue; (2) securing top administrative support; (3) encouraging hospital participation; (4) gathering information; (5) developing a written policy; (6) planning an implementation strategy; (7) communicating the policy; (8) implementing the policy; (9) enforcing the policy; and (10) evaluating the policy.

86–1852. Ledwith, F. **The Readiness of Practitioners to Give Advice on Stopping Smoking.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 229-233.

It is estimated that if every general practitioner (GP) advised his or her patients to quit smoking, the result would be 500,000 ex-smokers annually. This projection assumes that (1) all GPs are willing to give advice routinely to all smokers, and (2) there would be no diminishing returns on such advice over time. In November 1981, 2,595 GPs in Scotland were sent a copy of the "Give Up Smoking" kit with an invitation to receive more copies if needed. Although evidence suggested that GPs were willing to make the effort to request leaflets to hand out to patients, only about half followed the recommended procedure of giving them out personally, indicating that GP reluctance may be due to the low quit rate (3 to 5 percent). A media blitz on smoking cessation involving participation of GPs caused no increase in the readiness of doctors to counsel. However, a 12-month followup survey (46.5 percent responding) revealed that 14.7 percent were no longer smoking (11.6 percent for >9 months), for a success rate of 14.5 percent of those who replied (6.7 percent of all receiving advice). A similar followup of 195 patients revealed that 20 percent had stopped smoking (16.3 percent for >9 months), suggesting that GP advice followed by a simple inquiry could have considerable impact on cessation of smoking among patients.

86–1853. Lewis, G.F. **Preventive Intervention Via Psychological Immunization.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 235-237.

Preventive intervention by means of pyschological immunization can start with replacing the misnomer "smoking" with "chronic compulsive smoke inhalation" (CCSI). CCSI, or more bluntly, "spewking" or smoke spewing, conveys an immediate sense of a thoroughly reprehensible behavior and motivates appropriate action against it. The first priority is to recognize that CCSI is (1) a highly infectious, communicable disease transmitted to the young solely by social contagion, usually before their developing immunologic responses have matured to the point of healthy resistance; (2) a disease characterized by inflammatory lesions (angry carbuncles) that appear periodically on the face and hands; and (3) a disease that, like Herpes II, is extremely resistant to known treatment and may result in deep psychosocial trauma. By developing new and realistic ways of viewing the problem of smoking and smokers, receptive young minds can be prepared for educational injection. Today, for example, it is eminently clear that no one in his or her right mind would inhale smoke, let alone be seen inhaling smoke. What could possibly be worse for one's image? The disease "smokepox" needs to contained, isolated, and eventually eradicated in exactly the same way as other major contagious diseases. Who does not remember that old but very apt definition of a cigarette as a tobacco-filled paper tube with a fire at one end and a fool at the other?

86–1854. Musk, A.W.; Lindsay, D. **Smoking Control Policy.** *Medical Journal of Australia* 144(1):28-29, January 6, 1986.

The Thoracic Society of Australia, acknowledging that cigarette smoking is the single largest cause of preventable death and disease, has recommended a comprehensive smoking control policy (1) to achieve lower smoking rates in all groups of the population, (2) to encourage nonsmokers to remain nonsmokers, (3) to encourage smokers to either stop smoking or reduce their exposure to harmful components of tobacco smoke, (4) to proscribe all forms of tobacco promotion, and (5) to protect people from involuntary exposure to tobacco smoke. The objectives will be pursued through (1) research into smoking behavior to identify target groups and determine strategy; (2) public information; (3) public education; and (4) legislative support for programs, such as health warnings on all tobacco product packages, advertising bans of tobacco products, tar testing and labeling of cigarette packs, taxation increases on cigarettes, discontinuation of subsidies and incentives for production or promotion of tobacco, and establishment of smoke-free public and working environments. It is recommended that all members initiate and support these strategies to improve the well-being of their patients.

86–1855. Niehaus, G.; Tollison, R.D. **Economic Impact of Instituting Smoking Prohibitions in Michigan.** Michigan Tobacco and Candy Distributors and Vendors Association, 1985, 59 pp.

Major effects of imposing smoking prohibitions in Michigan are quantified, economic impacts of such prohibitions are discussed, and the issue of environmental smoke with respect to government regulations is reviewed. It is concluded that the proposed bill (State of Michigan HB 4500 and SB 196) restricting smoking in private and public workplaces, in retail marketing stores, arenas, and other indoor places, and upon buses and other public conveyances would (1) apply serious fiscal pressure on certain private and public sectors (particularly marginal, low-profit establishments) in enforcement and implementation costs; (2) affect primarily low- and moderate-income working people (e.g., more than half of smokers between the ages of 34 and 44 years earn only <7,000 dollars annually, compared with 35 percent of smokers who earn >25,000 dollars annually); (3) reduce direct revenues from tobacco taxes and subsequent reduction in smoking by an estimated 2.75 million dollars; and (4) create a negative climate for business investment in Michigan. It is suggested that benefits of proposed smoking control legislation are negligible because instances of smoking-related problems in workplaces and other facilities seldom occur, and that where they do occur, they are resolved through voluntary efforts by managers and owners without need for arbitrary government regulation. Those citizens most affected by secondary smoke inhalation, i.e., individuals with respiratory illnesses, are considered to be a minority, and protection for this group can be achieved through less expensive alternative methods rather than government interference.

86–1856. Noble, K.A.; Lauzon, R.R.J. **Guidelines for Administrators Creating Smoke-Free Hospitals.** *Dimensions in Health Service* 63(3):24-26, April 1986.

Fundamental considerations for hospital administrators establishing smoke-free hospitals are discussed. Hospitals are health institutions; health must be the justification for any policy, rule, or regulation curtailing smoking on hospital premises. Policies must be supported by top management, and must be well defined and disseminated widely inside and outside the hospital. Use of the term "smoke-free" is less confrontational than "smoking ban." Remedial measures are sometimes painful, and administrators should be restricted. Policy implementation has three basic stages: before, during, and after; the concept should be aired with emphasis on the positive health effects months before the policy is launched. Operators of hospital canteens need to be advised of the new policy and sales of cigarettes should be restricted. Education is vital to any smoke-free hospital policy implementation plan; as a public service, hospitals should offer smoking cessation clinics to patients, staff, and visitors for the first few months. No hospital can be 100 percent smoke-free 100 percent of the time. It is suggested that designated and limited smoking areas be provided. Finally, a longitudinal followup is an absolute necessity. Within days, a poorly launched policy could be challenged, and within weeks a poorly enforced policy could be ignored.

86–1857. Pederson, L.L. **Factors Related to Compliance With Physician Advice to Quit Smoking Among Patients With Pulmonary Disease.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 247-253.

Compliance with advice to quit smoking was studied to develop physician intervention strategies for patients with pulmonary disease. Routine advice to quit smoking was given to 308 patients aged 17 to 85 years. More than half were diagnosed with chronic obstructive pulmonary disease. Results showed that 12.8 percent were abstinent at the 6-month followup. Of 231 who were not successful quitters, 32.5 percent reduced the amount they smoked. Of all patients who tried to quit, 73 percent were recidivists. Married people were more likely to quit than nonmarried. Those who had a long-lived habit, who smoked for reasons other than addiction, who wanted to quit, and who predicted being abstinent at 6 months were more likely to quit. The most important variable was patient prediction of abstinence at 6 months. Age (older patients were more likely to be successful than younger ones), and number of children at home (fewer children at home contributed to parental smoking abstinence) were the only two variables continuously rated with success. Remaining variables, i.e., addiction as reason for smoking, strong desire to quit, educational level, and socioeconomic status, were associated with a 90 percent predictive accuracy.

86–1858. Perry, C.L.; Klepp, K.-I.; Halper, A., et al. **A Process Evaluation Study of Peer Leaders in Health Education.** *Journal of School Health* 56(2):62-67, February 1986.

Peer education is shown to be an important part of health education programs, particularly in smoking prevention programs. Two intervention programs, *Amazing Alternatives* and *Keep it Clean*, focusing on chemical abuse and smoking prevention, respectively, involved about 4,500 7th graders in upper midwest communities during 1983 and 1984. Perceptions of 207 students elected and trained as program peer leaders were assessed on (1) adequacy of peer leader training; (2) program components; (3) program influence on their behavior and attitude; and (4) program efficacy. Differences between genders and level of peer leader enthusiasm were also assessed. On a scale of 1 (very able/prepared) to 5 (not able/prepared), 87 percent of peer leaders assessed themselves as fairly efficient (1 and 2) in conducting activities according to the peer leader manual, but less well prepared (4 or 5) in keeping groups quiet and getting full participation. Activities such as determining nonsmokers/chemical users and analyzing cigarette advertisements' influence on smoking were scored highly, but public commitments and interviews with adults were rated poorly. Males, more often than females, rated the programs effective (65 vs. 48 percent, respectively; $p<0.05$). Social support from friends and family were significant factors in peer leaders' perception of program efficacy, and enthusiastic peer leaders were more apt to understand and follow the peer leader guide than less enthusiastic peer leaders.

86–1859. Pobee, J.O.M. **Will the African Escape the Ravages of Tobacco Smoke?** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 29-35.

The prevalence of smoking is 40 percent in most countries in black Africa. It is predominantly a male habit with a ratio of 5 to 14 male smokers to every one female smoker. Males consume an average of eight cigarettes/day compared with three for females. A low awareness of health hazards prevails, e.g., in Ghana less than 5 percent of those interviewed were aware of tobacco-related diseases, although Nigerian and Ugandan students were more knowledgeable. The attitude of governments is at best ambivalent and, in fact, negative, e.g., WHO-recommended suggestions for smoking control in Ghana have yet to be implemented. Tobacco production is increasing in developing countries. According to British Tobacco Research Council data, 1965 cigarette consumption in Ghana, Kenya, Malawi, and Sierra Leone was between 280 and 480 per person compared with 1,360 to 38,000 in developed countries. Current consumption in Ghana is 2,000 cigarettes/year/-person, or an increase of 316 percent in 15 years. Per capita income during the same period rose from 200 to 350 (U.S. dollar equivalency). The government, the tobacco companies, the advertising media, and shareholders derive huge incomes from the tobacco industry. Although smoking is not a problem yet in black Africa, evidence suggests that the African exposed to tobacco smoke long enough and in the right amount will succumb just like his Caucasian counterpart.

86–1860. Research Group of the Rome Project of Coronary Heart Disease Prevention. **Eight-Year Follow-Up Results From the Rome Project of Coronary Heart Disease Prevention.** *Preventive Medicine* 15(2):176-191, March 1986.

The Rome Project of Coronary Heart Disease Prevention was a primary preventive trial aimed at reducing smoking, serum cholesterol levels, high blood pressure, obesity, and sedentary lifestyle. Participants included 6,077 male workers (3,131 treatment; 2,896 controls) aged 40 to 59 years. Treatment over a 6-year period consisted of a mass education program, with individual sessions administered to about one-third of higher-risk; no intervention was offered to the control group. Mean changes in levels of main coronary risk factors in treatment versus control groups were computed in several ways. Net changes in the treatment group after 6 years, with adjustment for confounding variables, were +0.77 percent for cigarette consumption, -0.71 percent for body weight, -3.00 percent for systolic blood pressure, -5.39 percent for serum cholesterol, and -18 percent for estimated multivariate coronary risk. Prevalence of smoking was reduced 5.6 percent in the random sample vs. 2.8 percent in the high risk group, where consumption of cigarettes was down 8.4 percent. After 8 years of observation, mortality from all causes was lower by 9.8 percent ($p=0.140$) in the treatment vs. the control group, whereas mortality from coronary heart disease was lower by 23.7 percent ($p=0.059$). Incidence of fatal plus nonfatal coronary heart disease events in the first 6 months was reduced by 30.9 percent ($p=0.005$) in the treatment compared with the control group.

86–1861. Richmond, R.L.; Austin, A.; Webster, I.W. **Three Year Evaluation of a Programme by General Practitioners to Help Patients to Stop Smoking.** *British Medical Journal* 292(6523):803-806, March 1986.

Results of a general practice physician intervention program to help patients stop smoking show that 35 percent of patients in the treatment group were abstinent at 3 years compared with 8 percent in the control group ($p<0.001$). Of the 200 cigarette smokers in the program, half were allocated to a treatment group and half to a nonintervention control group. After the initial visit, treatment consisted of an educational consultation and four followup visits. Smoking status was assessed biochemically at 6 months and at 3 years. Of 64 patients who attended the educational consultation and first followup visit, 45 were not smoking at the first followup visit, 30 maintained abstinence up to 6 months, and 22 were not smoking after 3 years. Of the 37 patients who completed the treatment program and attended all followup visits, 57 percent were abstinent at 3 years. It is concluded that general practitioners can help patients stop smoking. (Auth. Abs. Mod.)

86–1862. Rimer, B.K.; Strecher, V.J.; Keintz, M.K., et al. **A Survey of Physicians' Views and Practices on Patient Education for Smoking Cessation.** *Preventive Medicine* 15(1):92-98, January 1986.

Physicians apparently are willing to adopt new smoking cessation practices for their patients, but incorporating cost-effective smoking cessation intervention that can be integrated into routine patient care is still the major challenge. Pennsylvania physicians were surveyed for (1) types of smoking strategies used with patients prior to Federal Drug Administration approval of nicotine gum; (2) how these strategies varied by respondents' characteristics; (3) nicotine prescription practices following FDA approval and assessment of success in quitting smoking after using the gum; and (4) intended change in physician intervention efforts with use of nicotine gum. The most frequently used health education strategies, with significant differences among specialty groups, were counseling only, counseling in combination with written materials or referral, and recommendation to stop smoking. Most responding physicians (87 percent) were aware of nicotine chewing gum, and of these, 71 percent reported an intention to prescribe it for patients who smoke. Family physicians were most inclined to prescribe nicotine chewing gum. Forty-seven percent of physicians had no followup data on patients for whom they had prescribed the gum. (Auth. Abs. Mod.)

86–1863. Sorensen, G.; Pechacek, T.; Pallonen, U. **Occupational and Worksite Norms and Attitudes About Smoking Cessation.** *American Journal of Public Health* 76(5):544-549, May 1986.

Marked worksite differences exist in subjective norms and attitudes toward smoking cessation. A total of 447 randomly selected smokers (278 males) from 10 worksites representing diverse industries of various sizes, including blue-collar (39 percent), clerical or sales (33 percent), and professional or managerial (28 percent) workers, were interviewed. Subjective norms regarding coworker support and discouragement during prior quit attempts, the perceived prevalence of smoking among coworkers, and three attitudes toward smoking cessation (interest in quitting smoking, confidence in the ability to quit smoking, and the desire to seek help in future attempts to quit) were assessed. Norms and attitudes were compared by occupation and worksite using analysis of covariance, controlling for age, sex, and education. Relationships of social norms to attitudes were examined using multiple regression analysis. Interest and confidence in quitting and desire to seek help in quitting were equally pervasive among workers from blue-collar and white-collar occupations. Substantial differences between worksites in attitudes and norms about smoking cessation suggest the importance of the unique social milieu of individual worksites. Of particular importance was the impact of coworker discouragement of prior quit attempts, varying across worksites and relating directly to confidence in ability to quit and desire to seek formal help in future quit attempts. Findings support the relevance of intervention programs aimed at changing worksite norms about smoking and smoking cessation.

86–1864. Spilman, M.A.; Goetz, A.; Schultz, J., et al. **Effects of a Corporate Health Promotion Program.** *Journal of Occupational Medicine* 28(4):285-289, April 1986.

Total Life Concept (TLC), a pilot health promotion program at a large communications corporation (American Telephone and Telegraph), resulted in lower health risks and improved health- and job-related attitudes among participating groups, particularly in the reduction of smoking. In an evaluation of the program, the study group was given an initial health risk appraisal and offered health education modules, while control groups were given neither or the health risk appraisal alone. Quit rates for participants in the smoking cessation module were 90 percent at the end of the program, and 53 percent after 5 months, compared with a rate of 24 percent among study group participants as a whole. It is concluded that study group employees showed greater overall improvement than control group employees in ability to stop smoking, in exercise levels, in perceptions of their own health, and in type A behavior, significantly reducing the risk of heart attack and the overall risk of dying for at least 10 years.

86–1865. Thornberry, O.T.; Wilson, R.W.; Golden, P. **Health Promotion and Disease Prevention Provisional Data From the National Health Interview Survey: United States, January-June 1985.** In: *Advance Data From Vital and Health Statistics,* No. 119. U.S. Department of Health and Human Services, Public Health Service, DHHS Publication No. (PHS) 86-1250, May 1986, 16 pp.

Although the downward trend in cigarette smoking has continued since the 1964 Surgeon General's Report on Smoking and Health, 33 percent of males and 28 percent of females still smoke. The majority of adults (≥ 80 percent) are aware of the major conditions associated with smoking, i.e., emphysema, chronic bronchitis, and cancer of the lung, larynx, and esophagus, while only one-third associate bladder cancer with smoking. These results reflect findings from the first 6 months (1985) of data collected by the National Center for Health Statistics in its health promotion and disease prevention survey, designed to monitor progress toward improving the health of Americans. American behavior patterns and knowledge of health practices are documented for general health habits, weight, preventive examinations for females, seat belts, home safety, high blood pressure, stress, exercise, cigarette smoking, alcohol use, and dental care. The survey, designed for the collection of baseline data, monitors all persons >18 years of age in four age groups. Fifteen priority areas have been targeted for objectives to be reached by 1990, when the next survey is scheduled.

86–1866. Whidden, P. **Nonsmokers' Rights—Overcoming the Negative Odour of Antismoking.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 147-150.

Nonsmokers' rights activists, who believe a smoker should be allowed a certain amount of liberty to smoke, are working for legislation and legal precedent in support of the liberties and rights of nonsmokers as well. This differentiates the rights activist from the antismoker, who has been labeled the do-gooder, the busybody, and the destroyer of liberty. The rights activist is battling to protect his turf. By refusing to be old-fashioned antismokers, nonsmokers' rights activists have placed themselves into an unassailable position that paradoxically is more subtly and profoundly antismoking precisely because it avoids all the negative aspects of antismoking. Principles of nonsmokers' rights include the following: (1) any lawful exercise to protect one's own liberties is a necessary and healthy acitivity; (2) people should be allowed to make their own choices unless their decisions and consequent actions strip another person of the same liberty of choice and action; and (3) where the smoker's polluting activity denies another person's right of access to clean air, it is the duty of the smoker to bow to this right, and the right of the nonsmoker to expect and demand legal protection from pollution in his air space. The nonsmokers' rights movement is positive, effective, and powerful.

86–1867. Wood, M.A.; Burnside, G.; Winckles, W., et al. **Use of Sporting Personalities in a Smoking Control Programme: Northern Ireland World Cup Football Campaign 1982.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 151-153.

A smoking control program employing sporting personalities of the Northern Ireland team is described. The Northern

Ireland World Cup Football Campaign 1982 was based on (1) widespread press publicity leading up the event, (2) production of a "Join Your World Cup Squad. Don't Smoke" posters, (3) Northern Ireland team souvenir brochures with an editorial by Action on Smoking and Health (ASH) and all cigarette advertising replaced by health agency messages, (4) personal appearances on television and radio programs by the captain and team members giving no-smoking advice, (5) media coverage of training sessions with Northern Ireland team wearing no-smoking logos on their track suits, and (6) the Scotland vs. North Ireland International match with exchange of pennants on the pitch. Itemized expenditures of the campaign are provided. Of 45,000 posters printed, 7,000 were distributed to all schools in Northern Ireland, accompanied by order forms for additional posters at nominal cost. In response, 25,500 posters were purchased by schools for individual pupils. Another 12,000 were distributed free, or purchased by youth, church, and other groups. With team success in the World Cup, the posters became collectors' items. On followup of headteachers and pupils in schools, the poster became an effective method for introducing the topic of smoking and health into the school curricula under a variety of subjects.

See also, **86–1817, 86–1821, 86–1883, 86–1892**

SMOKING CESSATION METHODS

86–1868. American Lung Association of Southeastern Michigan. **A Multidisciplinary Approach to Smoking Withdrawal in Ongoing, Economical and Successful Community-Based Programs.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 155-158.

The Cigarette Send-Off of the American Lung Association (Southeastern Michigan) is a hypnotherapeutic or "suggestive therapeutic re-education" program structured to the individual's wants, needs, and lifestyle in a positive ego-building manner that approaches cessation of smoking as a growth-producing, image-building tactic. The inexpensive program is readily available throughout the year, limited to one 3-hour session, relies on peer support, and is open to everyone. Two group-therapy techniques incorporated into the program are (1) a verbal public vow to quit smoking on the day of the program, and (2) a ritual to physically and emotionally part with habitual behaviors (throwing away cigarettes, lighters, and smoking paraphernalia). The Cigarette Send-Off has helped change the smoking behavior of 95 percent of its participants in southeastern Michigan. Over 2,000 people have quit smoking, cut down on quantity smoked, or switched to low tar and nicotine brands. The average annual quit rate for nine clinics analyzed was 46 percent, while corporate clinics offering financial incentives to participants averaged a 65 percent quit rate.

86–1869. Bartlett, E.E.; Windsor, R.A.; Lowe, J.B., et al. **Guidelines for Conducting Smoking Cessation Programs.** *Health Education* 17(1):31-37, February-March 1986.

The Guidelines provided for training health educators in smoking prevention and cessation programs are based on two randomized smoking cessation evaluation studies (1982 to 1986) involving 1,000 adults: (1) pregnant women at maternity clinics in a public health department and (2) full-time employees. Recommendations draw on experiences in leading group classes providing individual and group services to employees, patients in a medical practice and public health clinics, and a voluntary agency. Educational skills for smoking cessation are classified into (1) preparation, (2) session structure, (3) instruction and counseling skills, (4) responding to specific problem situations, and (5) followup skills. The skills are designed to be useful, regardless of the specific cessation program or technique. General orientation is based on the concept of a behavioral diagnosis (or educational diagnosis) that reflects a problem-solving approach, builds on client strength, and tries to overcome obstacles to behavior change.

86–1870. Blackburn, H.; Pechacek, T.F. **Smoking Cessation and the Minnesota Heart Health Program.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 159-163.

The Minnesota Heart Health Program (MHHP) is a community-based research and demonstration project designed to accelerate population-wide changes in coronary risk factors and disease. The smoking education plan, one component of this effort, is based on the assumption that general awareness of health hazards of smoking is already firmly established and that primary emphasis should be on social and psychological benefits of quitting. Secondary emphasis is placed on long-term health risks of smoking to assure that the effects are clearly understood, especially regarding the role of smoking and heart disease. Messages are targeted to smokers, nonsmokers, and ex-smokers with special attention to subgroups of current smokers, including women, middle-aged men, blue-collar workers, and adolescents. Nonsmokers and ex-smokers are actively encouraged to participate in the program to provide the support necessary for a nonsmoking environment. A major MHHP hypothesis is that systematic and multiple-strategy, community-wide health education programs will lead to a change in attitude about heart disease and its prevention, about behaviors related to risk for heart disease, and about physiologic risk factors, ultimately altering disease rates. Although some of these changes are occurring naturally, MHHP aims to accelerate the process.

86-1871. Campbell, I.A. **Predictive Factors for Smoking Withdrawal in Patients.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 165-169.

Hospital physician-to-patient advice to stop smoking was credited with a 9.7 percent long-term (1 year) cessation and abstention rate similar to that achieved when advice was supplemented with a booklet, or booklet plus placebo, or nicotine chewing gum. Respiratory diseases (mostly chronic bronchitis and emphysema) accounted for 81 percent of patients in the study, 9 percent had ischemic heart disease, and 10 percent had peptic ulcer, hypertension, or peripheral vascular disease. Mean patient age was 49 years, 63 percent were men, 70 percent smoked ≥ 20 cigarettes/day, and 26 percent came from socioeconomic groups I and II. Success rates increased with age, and people with heart disease did better than those with any other diagnosis. The highest success rate, 21 percent, was found for men with heart disease. Men (12.2 percent) were more successful than women (5.3 percent, $p<0.001$). Single or married men were more likely to succeed than those separated or divorced. Success was less likely if the other person in the patient's life was a smoker or if the patient thought his health problem was related to smoking. Cigarette consumption, social class, age of smoking onset, concern about weight gain, and perceived benefits of stopping did not relate to success. Factors associated with immediate relapse (1 month) were worry and anxiety, triggering the urge to smoke. At 3 months, those who were successful craved tobacco less often, and found it easier to do without cigarettes.

86-1872. Glasgow, R.E.; Klesges, R.C.; Mizes, J.S., et al. **Quitting Smoking: Strategies Used and Variables Associated With Success in a Stop-Smoking Contest.** *Journal of Consulting and Clinical Psychology* 53(6):905-912, December 1985.

Perceived stress was the only variable to predict success in smoking cessation in a study of 134 participants of a community-wide stop-smoking contest conducted by the Minnesota Heart Health Program. Contestants were assessed by telephone interviews upon entry into the contest, before the quit date, and within 1 week of conclusion of the month-long contest; they comprised 84 women and 66 men (mean age 34 years) who averaged 25 cigarettes/day of about 0.80 mg/cigarette nicotine yield. Participants provided information on demographic characteristics, smoking history and patterns, degree of nicotine addiction, perceived stress, and level of general social support; these were used prospectively to predict success at quitting. Followup interviews collected short-term retrospective reports of cognitive, behavioral, and general smoking modification strategies used, and amount of social support received specific to stopping smoking. Perceived stress was consistently predictive of outcome in both prospective and concurrent analyses of the stress scale used, suggesting that the often-heard attribution of failure at behavior change to high stress levels is not solely a post hoc rationalization. Stress was also mentioned in response to an open-ended question about the most important reason for failure. Successful abstainers also used self-reward strategies and positive self-statements more often than less successful subjects. (Auth. Abs. Mod.)

86-1873. Gotestam, B.; Gotestam, K.G. **Controlling Factors for Smoking.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 187-192.

Factors controlling smoking are reviewed with emphasis on the debut, cessation, maintenance, and relapse phases. Most people have little knowledge about smoking and its short- and long-term effects on the body and health. Much can be done to spread information and to educate people to smoking facts. Family, peers and friends, media, and work and school sites are environmental factors that affect smoking debut and maintenance. Physiological factors such as nicotine stimulation, relaxation, habituation, and dependence have as much a role in maintenance as psychological factors such as behaviors and rituals, and more research is needed into their relationships. Of the different phases, debut appears to be most important for analysis; prevention with emphasis on maintenance of the no-smoking condition needs to be explored. New types of collaborators, such as general practitioners, nurses, co-therapists in parents, peers, ex-smokers, and teachers, may be a way to reach more smokers who want to quit. Medical strategies (e.g., lobelin, nicotine chewing gum), psychological approaches (e.g., hypnosis, rapid smoking), and use of mass media have attracted new interest. It is suggested that future research focus on reasons for relapse.

86-1874. Greaves, L.; Barnes, G.E.; Vulcano, B.A. **Quit for Good: Regina Smoking Cessation Program.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 193-199.

The Regina smoking cessation project was designed to (1) identify the type of people who attend smoking clinics; (2) determine program components most helpful in quitting smoking; (3) examine withdrawal symptoms and other quitting difficulties; (4) determine proportion of abstinence at 6 months; and (5) assess problems and reasons for relapse. Participants averaged 34.9 years of age, 59.1 percent were female, and 70.1 percent were married. Average age at smoking onset was 16.3 years; at entry into the program smokers were consuming an average of 24.4 cigarettes/day. Nearly all (93.3 percent) had attempted quitting an average 4.3 times, 19 percent with assistance. Main reasons given for smoking were pleasurable relaxation (61.3 percent), pleasurable addiction (63.1 percent), and tension reduction (63.4 percent). Main reasons given for quitting were personal discomfort, health awareness, responsibility to others, annoyance to others, and expense. Most frequent withdrawal symptoms were craving for food (63.6 percent), very severe craving to smoke (45.5 percent), tiredness (36.6 percent), sleepiness (31.4 percent), and taste changes (25.8 percent). Although the initial quitting rate was high (80 percent), only 35.7 percent were abstinent at 6 months. Reasons for relapse were habit (32.8 percent), stress or life change (31 percent), and negative mood states (19 percent).

86–1875. Gunn, R.C.; Shapiro, A. **Life Stress, Weight Gain, and Resuming Smoking After Success in a Cessation Clinic.** *Psychological Reports* 57(3,Part 2):1035-1039, December 1985.

Although external pressure was the most common reason given for returning to smoking after successfully quitting at a cessation clinic, negative life experiences were no more frequent among relapsers than among those who remained stopped. In fact, nonsmokers reported more life changes in the preceding 3 months than did smokers ($p<0.05$). Weight gain, reported by 80 percent of nonsmokers, was not a significant reason given for resuming smoking. Of 89 successful quitters, 61 percent were still not smoking 3 months after the clinics' end; proportionally, women fared as well as men in remaining nonsmokers. Reasons cited for recidivism were stress, pressure, or nervousness (57 percent), other people (14 percent), and weight gain (3 percent); 29 percent cited no reason or simply a desire to smoke. One demographic variable, amount smoked at onset of the clinic, successfully predicted continued nonsmoking at 3 months. Lighter smokers (≤ 29 cigarettes/day) were more successful in remaining quitters at clinic's end than heavier smokers (≥ 30 cigarettes/day; $p<0.05$).

86–1876. Hackbarth, D.P.; Gruder, C.L.; Berkson, S.B. **A Voluntary Health Organization as "Honest Broker" of a Smoking Cessation Program.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 201-207.

The search for more effective intervention has led a voluntary health organization to form a smoking cessation network of volunteers and community agencies that, based on a 4-year record and a 23-percent quit rate, has helped 800 individuals to kick the smoking habit. Inspired by the Chicago Lung Association and the Psychology Department of the University of Illinois, the network concept is based on its acceptability to smokers, its relative simplicity (so that intervention was not dependent on specialized skills of highly trained professionals), and its effectiveness. Selection criteria for network agencies include being an established organization, running clinics on a nonprofit basis, adhering to the prescribed clinic format, and maintaining confidentiality and ethical standards. The clinic format involves (1) interval-smoking techniques (response averaging); (2) relaxation and breathing exercises; (3) rewards and self-reinforcement; (4) weekly contracts; (5) buddy system; and (6) group support. Over a 4-year period, 358 clinics serving about 3,500 people were conducted by network volunteers throughout Cook County and Northern Illinois. Target groups for most stop-smoking clinics were the community at large (68 percent), followed by employees (18 percent), students (8 percent), and patient populations (6 percent).

86–1877. Hirvonen, L. **Premises and Results of Smoking Withdrawal.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 215-220.

Smoking cessation and long-term abstinence is predictable by (1) gender; (2) previous long nonsmoking periods; (3) regular withdrawal clinic participation; (4) interest in medical aspects of smoking; (5) rapid abstinence; (6) mild or absent withdrawal symptoms; (7) weak craving during clinic sessions; and (8) rapid recovery of taste and smell. Information is based on responses from 1,800 (67.4 percent) participants in 18 Five-Day Plan courses held in 13 cities in Finland in 1973 to 1980. The most important factor in smoking cessation results was gender; although females started later, smoked less, and their immediate cessation rate was equal to that of men, they relapsed more easily. Irritability, inability to concentrate, and a sense of hunger were more common withdrawal symptoms among males than females; before cessation, these symptoms were more common among females. Relapse was triggered mainly by a strong craving for cigarettes and alcohol by males. The need for association with other people and psychical symptoms were reported as reasons for relapse by females. However, the majority of relapsed participants were willing to try stopping again and believed in success.

86–1878. Hughes, J.R.; Hatsukami, D. **Signs and Symptoms of Tobacco Withdrawal.** *Archives of General Psychiatry* 43(3):289-294, March 1986.

Signs and symptoms of tobacco withdrawal were evaluated in a study of 50 smokers during 2 days of ad lib smoking and, later, during the first 4 days of abstinence. Observed smokers consumed an average of 29 cigarettes/day (nicotine content of 0.9 mg/cigarette) for 21 years, and 26 percent reported attempting to quit smoking >3 times. To test the validity, magnitude, and clinical significance of tobacco withdrawal as defined by the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III), both observed and reported signs and symptoms were measured. Observer and subject ratings of DSM-III symptoms of tobacco craving, irritability, anxiety, difficulty concentrating, and restlessness increased after cessation. In addition, bradycardia, impatience, somatic complaints, insomnia, increased hunger, and increased eating occurred. Frequency and intensity of the symptoms varied from person to person; however, average distress from tobacco withdrawal was similar to that observed in psychiatric outpatients. Persons who had more withdrawal discomfort were more tolerant of cardiovascular effects of nicotine. Persons with greater withdrawal discomfort did not have a lower rate of smoking cessation. (Auth. Abs. Mod.)

86–1879. Hughes, J.R.; Hatsukami, D.; Skoog, K.P. **Physical Dependence on Nicotine in Gum. A Placebo Substitution Trial.** *Journal of the American Medical Association* 255(23):3277-3279, June 20, 1986.

Physical dependence may be a cause of behavioral dependence on nicotine gum; that is, ex-smokers may continue to use the gum beyond the recommended period to avoid withdrawal symptoms. Eight ex-smokers using nicotine gum participated in a randomized, double-blind, placebo-substitution trial to test whether ex-smokers become physically dependent on nicotine in gum. Subjects were predominantly middle-aged women who had smoked at least a pack/day of moderate strength cigarettes for at least 20 years and who, as ex-smokers, had consumed an average of 10 pieces of gum/day for 3 to 13 months. When placebo was substituted, seven of the eight subjects were observed having withdrawal symptoms (i.e., irritability, anxiety, restlessness, impatience, drowsiness, tobacco craving, and depression); two eventually relapsed to smoking or to chewing nicotine gum. Total observer-rated withdrawal discomfort during placebo-substitution was greater than the average withdrawal discomfort during nicotine gum periods ($p<0.01$). Total subject-rated withdrawal discomfort also increased during placebo substitution ($p<0.01$). It is concluded that symptoms appearing with cessation of nicotine gum use were aversive and, in two cases, appeared to cause relapse. Both relapses occurred during placebo substitution and were preceded by the two highest ratings of observed withdrawal. It is recommended that physicians emphasize the need for gradual reduction of nicotine gum to patients in smoking cessation programs.

86–1880. Kaetz, D.; Samson, Y.; Scott, K.E. **Community Based Smoking Cessation Using Support Groups.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 221-223.

A community-based project on smoking cessation for pregnant women in Nova Scotia was designed to decrease the number of low weight (<2,500 g) births, thereby decreasing the need for neonatal intensive care and, ultimately, the incidence of mental handicap. Overall objectives were to encourage (1) physicians to motivate the mother to cut down or quit smoking; (2) community health nurses to provide cessation counseling; and (3) community volunteer leaders to set up self-help support groups in smoking cessation. Of 202 women counseled by physicians, 59 expressed interest in attending a smoking cessation group; of these, 20 came to first meetings. Of 16 women who completed the program, 4 stopped smoking and 5 cut down. A postproject analysis revealed that (1) information on dangers of smoking to the fetus did not motivate most mothers enough to seek help in cessation; (2) in many rural communities smoking is still accepted uncritically and with little attention paid to health implications; (3) health care professionals who are smokers were hesitant in promoting cessation; (4) transportation was a frequent problem in rural communities; and (5) unwillingness to become involved in the group and the large attrition rate of those who did get involved, was characteristic of addictive behavior.

86–1881. Rogers, J. **A Review of Causes of Recidivism and Related Considerations.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 255-260.

The underlying cause of recidivism is inadequate motivation and a negative attitude of the ex-smoker, who feels that something of value has been taken away and succumbs to (1) complacency, (2) completion of the pleasurable cycle, (3) spite, (4) unjustified confidence, (5) weight gain, (6) personal trauma, (7) loneliness, (8) sleep disturbance, (9) constipation, (10) periodontal problems, (11) changes in endocrine balance, or (12) alcohol. A recent ex-smoker who views not smoking as a newly found freedom and an expression of self-mastery will withstand discomforts and deal directly with the problem without a cigarette. These conclusions are based on evaluation and personal observation of about 300,000 smokers who participated in SmokEnders over the past 13 years. SmokEnders is described as a standardized, highly structured, 8-week seminar with a fixed cut-off date 5 weeks from the first session that attracts from 20,000 to 40,000 participants annually. SmokEnder seekers are usually about 30 years of age, equally divided between the sexes, and have incomes averaging from 10,000 to 40,000 dollars annually. A review of the SmokEnder program and the basis for their evaluation is presented. Basic groups and personalities most likely to fail from inadequate motivational development are categorized.

86–1882. Schneider, N.G.; Jarvik, M.E. **Nicotine Gum vs. Placebo Gum: Comparisons of Withdrawal Symptoms and Success Rates.** In: Grabowski, J.; Hall, S.M. (Editors). *Pharmacological Adjuncts in Smoking Cessation.* U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse Monograph 53, DHHS Publication No. (ADM) 85-1333, 1985, pp. 83-101.

A review of studies comparing nicotine versus placebo gum suggests that combining advice from physicians to stop smoking with treatment of pharmacological dependence and with long-term behavioral training and support may provide the most effective smoking cessation intervention to date. The data indicate that initial and prolonged use of nicotine gum figures prominently in cessation outcome. There is evidence that nicotine gum provides nicotine-specific withdrawal and relief, particularly when combined with behavioral treatment. Nicotine gum appears to be valuable both as a systematic tool and as a means of combating short- and long-term nicotine seeking that contributes to maintenance of smoking and inability to quit. The role psychological factors play in enhancement of success is less certain. Appropriate dose and carefully instructed use are critical. Use variables (dose, number of pieces, length of time on gum, instructions) must be defined through controlled evaluation. It is recommended that intervention focus on long-term relapse prevention.

See also, **86–1828, 86–1837**

PASSIVE SMOKING

86–1883. Aarflot, A. **Some Social and Pedagogical Aspects of Smoking.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 55-58.

The antisocial aspect of smoking may prove to be a more potent means of inducing smokers to quit the habit, and of discouraging prospective smokers from starting, than all the medical information about health hazards. The tobacco industry's concerns (*U.S. Tobacco Journal,* October 1973) center upon the growing opposition to passive smoking by nonsmokers. Research has established the health hazards of passive smoking. In Sweden, a recent national opinion poll demonstrated that 90 percent of all Swedes desire smoke-free workplaces and public environments. In Norway, smoking is increasingly regarded as socially unacceptable, out-of-date, and a dying habit that should be allowed only in special detached smoking rooms. The majority of smokers, according to opinion polls, favor restrictions on smoking. By allowing smoking only in special areas, nonsmokers can breathe clean, smoke-free air, and the smoker is assured that he is not harming others by his smoking. All common areas should be smokeless and not equipped with ashtrays, which invariably invite smoking. It is suggested that a social attitude be promoted that makes smokers look for a "Smoking Allowed" sign before starting to smoke and not, as they do now, look for a "No Smoking" sign and, seeing none, start smoking.

86–1884. Amankwah, K.S.; Kaufmann, R.C.; Weberg, A.D. **Ultrastructural Changes in Neonatal Sciatic Nerve Tissue: Effects of Passive Maternal Smoking.** *Gynecologic and Obstetric Investigation* 20(4):186-193, 1985.

Sciatic nerve tissue in offspring of female mice exposed to passive smoking showed definite toxic effects, indicating that passive maternal smoke inhalation may result in abnormal changes to fine structure of fetal tissue. Pregnant mice of the C57BL/KsJ strain exposed to low-tar cigarette smoke in a special chamber produced litter sizes not notably different from control litters (4.73 vs. 5.09, respectively), while mean birth weight of smoke-exposed pups was 1.3014±0.0552 g, significantly ($p<0.05$) lighter than the 1.3620±0.1141 g mean birth weight of control pups. Ultrastructural abnormalities of 1-day-old pups of smoke-exposed mothers included (1) swollen mitochondria with distorted cristae; (2) some indication of deformed mitochondria; (3) darkened nuclei with condensations of nuclear material; (4) lamellar bodies; (5) π granules, and (6) myelin bodies similar to those seen in human toxicity studies. Suborbital blood samples from pregnant smoke-exposed mice showed a mean hemoglobin carbon monoxide saturation of 9 percent, equivalent to that found in humans who actively smoke 10 to 20 cigarettes/day.

86–1885. Burchfiel, C.M.; Higgins, M.W.; Keller, J.B., et al. **Passive Smoking in Childhood. Respiratory Conditions and Pulmonary Function in Tecumseh, Michigan.** *American Review of Respiratory Disease* 133(6):966-973, June 1986.

Passive exposure to cigarette smoke was associated with an elevated prevalence of phlegm, wheeze, asthma, and chest colds among male, and wheeze, bronchitis, and chest colds among female children aged ≤ 19 years in a Michigan study. Nearly 62 percent of the 3,482 children studied were exposed to at least one parent who smoked. Using logistic regression, offspring were shown to be 1.5 to 2.0 times more likely to have a respiratory condition if both parents currently smoked than if both parents never smoked. Forced expiratory volume in 1 second (FEV_1) and forced vital capacity (FVC) among males, and forced expiratory flow at 50 percent of vital capacity ($Vmax_{50}$) among females were significantly lower in nonsmokers 10 to 19 years of age whose parents were current smokers compared with similar offspring of never smoking parents. Respiratory conditions were generally more frequent and the level of lung function generally lower for males from households where only mothers smoked compared with males from households where only fathers smoked. In females, similar relationships were less consistent. Differences tended to be larger and more often significant for males than for females. Comparisons between offspring of two current and two never smoking parents, and those involving the number of parent smokers in a child's lifetime, provided stronger associations of passive smoking with respiratory conditions and lung function than did the number of household smokers, duration, or amount of parent smoking. (Auth. Abs. Mod.)

86–1886. Chen, Y.; Li, W.-X. **The Effect of Passive Smoking on Children's Pulmonary Function in Shanghai.** *American Journal of Public Health* 76(5):515-518, May 1986.

The father's cigarette smoking status during a child's lifetime was linearly related to a decrease in percent predicted values of forced expiratory volume in 1 second ($FEV_{1.0}$), maximal midexpiratory flow (MMEF), and forced expiratory flow from 62.5 to 87.5 percent of forced vital capacity in 571 schoolchildren aged 8 to 16 years. In girls, the father's smoking status accounted for 0.5, 1.2, and 1.6 percent of the total variation in these values, respectively; the trend was less marked in boys. Lung function tests were performed at Shanghai (People's Republic of China) primary and secondary schools, and questionnaires were completed by parents. Other environmental factors, such as educational level of the father, use of coal or gas for cooking, and presence of patients with chronic respiratory diseases in the family, had no important effects on children's pulmonary function. The hazardous effect of cigarette smoking on the health of passive smokers, children, was dependent not only on the number of cigarettes smoked, but also on ventilation and volume of enclosed space. Because living space in the urban Shanghai area is crowded, it is suggested that the actual amount of indoor exposure to children may be substantially greater than in many other areas of the world.

86–1887. Henschler, D. (Editor). **Passivrauchen am Arbeitsplatz. Senatskommission zur Prufung gesundheitsschadlicher Arbeitsstoffe. [Passive Smoke in the Workplace. Senate Commission to Test Health-Threatening Industrial Materials.]** Weinheim, Federal Republic of Germany, VCH Verlagsgesellschaft mbH, 34 pp., 1985, German.

Passively inhaled smoke in the workplace is a health hazard and should be considered a cancer-causing industrial substance or mixture of substances. A review of 10 epidemiological studies on the carcinogenicity of passively inhaled smoke has established a clear trend of health hazards from passive smoke exposure. Tobacco smoke contains many cancer-causing substances; some of these substances are in higher concentrations in sidestream smoke than in mainstream smoke. The quantitative exposure of passive smokers to airborne substances in a heavily smoke-filled room can be as heavy as that of active smoking. Although a causal relationship between passive smoke inhalation and cancer cannot be irrefutably concluded at this time, suitable preventive measures are recommended to protect nonsmokers in workplaces heavily contaminated by tobacco smoke.

86–1888. Kossuth, L.C. **Smoking Areas Are Ineffective in Sick Buildings. (Letter).** *Journal of the American Medical Association* 255(23):3244-3245, June 20, 1986.

The American Medical Association appears to have been trapped by the fallacy that designation of smoking areas prevents pollution of air by tobacco smoke in the building (*Journal of the American Medical Association* 255(8), February 1986). Unless there is special air-handling equipment, the nonsmoking areas will be polluted by air recirculating from smoking areas. Equally important, invisible tobacco smoke air pollution increases throughout the day. In a modern building designed with usual heating, air-conditioning, and ventilating equipment, air is continuously circulated in the building, resulting in workers suffering from the tight or "sick" building syndrome. Unless adequate fresh air is introduced into the system, tobacco smoke products build up in recirculated air. Sweden requires that 30 percent fresh air be introduced into its buildings every hour. A better approach is to determine the air quality desired and to provide appropriate ventilation to produce minimal indoor air pollution. Designating a smoking area does not protect the nonsmoker. Only proper control of adequate ventilating equipment provides acceptable levels of indoor pollution from tobacco smoke. Zero risk from cigarette sidestream smoke requires banning smoking throughout the building.

86–1889. Lee, P.N. **Passive Smoking.** *Ettore Majorana Science Series. Life Sciences* 17:187-214, 1984.

Passive smoking does not appear to result in any material risk of serious disease for the healthy nonsmoker, according to an independent epidemiological review. Early claims of health hazards associated with smoking, such as annoyance and irritation, allergy, respiratory effects in children, psychomotor effects, and exercise tolerance, lack supporting evidence. Dosimetric data suggest that in average circumstances, nonsmokers are exposed to less passive smoke than smokers are to active smoke, and that smokers are more exposed to their own passive smoke than are nonsmokers. Studies have shown that passive smoke exposure outside the home may be greater for those married to smokers (7.8 hours) than for those married to nonsmokers (4.6 hours). More recent evidence reviewed includes effects on the small airways, lung cancer, and the results of Japanese, Greek, U.S., Hong Kong, Louisiana, and German studies. It is concluded that most current studies are incomplete, biased, or encumbered with confounding factors, and that until more convincing evidence appears, passive smoking does not pose serious health risks for the nonsmoker.

86–1890. Levin-Epstein, M.; Sala, S.J.; Day, J. (Editors). **Where There's Smoke: Problems and Policies Concerning Smoking in the Workplace.** Bureau of National Affairs Special Report, (Product Code 45 LDSR-46), Bureau of National Affairs, Inc., Rockville, Maryland, 1986, 140 pp.

Smoking in the workplace is under attack, according to a survey of the extent and nature of workplace smoking policies and perceptions of the effects such policies have on employee relations, productivity, and employment costs. Background of the workplace smoking issue, attitudes of labor unions, and the legislative and legal status of workplace smoking concerns were analyzed and case studies documented. Among the findings are (1) 36 percent of 660 responding employers have adopted workplace smoking policies, with 2 percent planning to enact policies by the end of 1986 and 21 percent reporting such policies under consideration; (2) 85 percent of smoking policies were adopted in the last 5 years; (3) 40 percent of workplace smoking policies ban smoking in all open work areas, and 6 percent ban smoking anywhere on employer property; (4) 28 percent of workplace smoking policy adoptions were spurred by local or state legislation, 22 percent by employee health or comfort, and 21 percent by employee complaints; (5) 54 percent of smokers support smoking restriction policies in their workplace, 20 percent appear to be neutral, and only 10 percent oppose them; and (6) smoking restrictions appear to have little or no effect on employee productivity or costs.

86–1891. Office of Technology Assessment. **Passive Smoking in the Workplace: Selected Issues.** U.S. Congress Office of Technology Assessment, Special Projects Office of the Health Program, May 1986, 70 pp.

Health effects related to passive smoking are reviewed, current Federal, State, local, and private workplace smoking policies are examined, and the cost effectiveness of implementing a workplace smoking policy is analyzed in this Office of Technology Assessment staff paper. There is evidence for an association of passive smoking with lung cancer; a causal relationship is biologically plausible. Environmental tobacco smoke is an acute respiratory irritant in healthy adults. Parental smoking has been associated with respiratory infections and symptoms in their children. Some studies suggest that passive smoking exacerbates angina pain and increases risk of death from heart disease. The carcinogenic effect of passive exposure to cigarette smoke on lung cancer is smaller than that observed for direct cigarette smoking. The majority of Americans support workplace smoking policies. Both the private sector and governments at all levels are increasingly adopting or strengthening such policies with no evidence of retrenchment. Reducing workplace smoking may lead to a reduction of smoking-related disease among nonsmokers, less absenteeism among workers, and consequent savings in medical and production costs. Other benefits listed are fewer smoking-related fires, lower insurance costs, and cleaner office environments. Alternatives to workplace smoking policies, e.g., ventilation systems, are also discussed.

86–1892. Raab, K.H. **Is Smoke Control an Illusion?** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 37-41.

Increasing awareness of tobacco smoke as a socially unacceptable indoor air pollutant has spurred industry to develop mechanical, electrical, and chemical systems and devices for cleaning air in the home and workplace. However, few air cleaners are effective in removing tobacco smoke particles, the smallest of which pose the greatest risk to the human respiratory system. Various systems and devices are reviewed for their effectiveness and deceptiveness. The most desirable method of odor control, elimination using adsorbents or oxidants, is also the most expensive. A more common technique is odor modification. Counteractants that chemically alter or reduce perceived odors by allosteric inhibition (altering the conformation of olfactory receptor site proteins) do not reduce air pollution; they increase it. Counteractants are used in commercial buildings, trains, airplanes, and homes. They are unregulated, and although presumed to be safe, toxicity data on their compounds is lacking. Tobacco smoke odor constitutes a huge potential market for counteractants. Reports indicate that the "declining willingness to tolerate tobacco smoke" constitutes "perhaps the most potentially dangerous threat to the future of the tobacco industry." It is concluded that counteractants are not only deceptive but, if used to mask the odor of tobacco smoke, may also weaken the resolve of nonsmokers to combat passive smoking.

86–1893. Tager, I.B. **"Passive Smoking" and Respiratory Health in Children—Sophistry or Cause for Concern?** *American Review of Respiratory Disease* 133(6):959-961, June 1986.

A review of literature on passive smoking shows substantial consistency and strength (in magnitude and dose—effect) in the association of passive exposure to tobacco smoke in childhood and short-term respiratory health. Temporal aspects of the data, especially the in utero exposure hypothesis, are sensible and coherent, and biologically plausible explanations can be developed. Data on long-term effects, however, have less secure footing. Given the very large number of people at risk of passive exposure to tobacco smoke, public health decisions may have to be made before more definitive scientific data are available. It is recommended that investigation into this problem be continued to serve as a paradigm for the understanding of the interaction of complex low-dose environmental exposures and human health. Methods of assessing exposure to environmental tobacco smoke in epidemiological studies are examined and important study results are reviewed.

86–1894. Winters, T.H.; DiFranza, J.R. **Passive Smoking: A Public Health Problem.** *Public Health Reviews* 13(3-4):309-323, 1985.

While further research is needed to clarify and further explore the health effects of passive smoking, the weight of evidence indicates that passive exposure to cigarette smoke constitutes a health hazard. Passive smoking has been shown to increase the risk of lung cancer, pneumonia, bronchitis, middle ear disease, and allergic phenomena. Passive exposure to cigarette smoke can adversely affect angina, asthma, Raynaud's phenomenon, and pulmonary function, and can irritate the eyes, nose, throat, and airways in healthy people. Nonsmokers are involuntarily exposed to significant air pollution burdens from indoor smoking. Based on evidence presented, it is suggested that nonsmokers have strong health reasons to avoid being subjected to harmful effects of breathing tobacco smoke. It is recommended that health care workers support efforts to restrict smoking in indoor environments such as the home and the automobile. Public health policy in workplaces and public buildings is discussed.

See also, **86–1668, 86–1681, 86–1692, 86–1706, 86–1723, 86–1735, 86–1775, 86–1779, 86–1812, 86–1866, 86–1942**

SMOKELESS TOBACCO

86–1895. Berman, E.J.; Fischer, P.M.; Richards, J.W., et al. **Use of Smokeless Tobacco Among Adolescents. (Letter).** *Journal of the American Medical Association* 255(23):3245, June 20, 1986.

Self-reported regional data indicate that 10 to 40 percent of U.S. adolescents use smokeless tobacco. A recent survey of 296 high school students (urban and suburban) used a self-report questionnaire monitored by "bogus pipeline" (threat of verifying questionnaire responses by saliva thiocyanate measurements); results indicated that 16 percent used smokeless tobacco and that its use increased with age: 9 percent in 15-year-olds, 16 percent in 16-year-olds, and 19 percent in 17-year-olds ($p<0.03$). This is a greater percentage than that reported in studies of other high school populations. When analyzed by sex, 27 percent of male versus 4 percent of female students reported using smokeless tobacco, exceeding rates found by other researchers. Tobacco companies have reported an 11 percent annual increase in smokeless tobacco sales since 1974, and other reports estimate 22 million users in the United States. The 27 percent user rate among high school students approaches that of countries like Pakistan and India where 30 to 40 percent use smokeless tobacco. These countries have head and neck cancer rates that exceed 40 percent of all reported tumors. Increased risks of oral and pharyngeal carcinomas may become major public health problems with more prevalent use of smokeless tobacco. It is suggested that a national study using validation techniques be initiated for obtaining better data on adolescent use of smokeless tobacco.

86–1896. Hoffmann, D.; Harley, N.H.; Fisenne, I., et al. **Carcinogenic Agents in Snuff.** *Journal of the National Cancer Institute* 76(3):435-437, March 1986.

The five most popular U.S. brands of snuff were examined for alkaloid, volatile and tobacco-specific N-nitrosamine (TSNA), benzo(*a*)pyrene (BaP) (CAS: 50-32-8), and polonium-210 content. Carcinogenic TSNA content ranged from 9,600 to 289,000 ppb, exceeding nitrosamine concentrations of other consumer products by at least two orders of magnitude. Polonium-210 amounted to 0.16 to 1.22 pCi/g dry snuff. Trace amounts of BaP (0.1 to 63 ppb) indicated tobacco contamination with thermal degradation products, probably the result of fire curing or flue curing. Snuff-dipping in the United States has been increasing, especially among young people. In 1984, about 21,600 tons of snuff were consumed by an estimated seven million snuff dippers. It is suggested that modifications be made in production of snuff, due to increased risk for cancer of the oral cavity and pharynx in snuff dippers and the presence of relatively high concentrations of carcinogenic N-nitrosamines, especially nicotine-derived nitrosamines, and of polonium-210. Reduction of such carcinogens in snuff appears to be feasible because TSNA are formed during tobacco processing and polonium-210 originates mainly from specific fertilizers. (Auth. Abs. Mod.)

86–1897. National Institutes of Health. **The Health Consequences of Using Smokeless Tobacco. A Report of the Advisory Committee to the Surgeon General, 1986.** U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, NIH Publication No. 86-2874, April 1986, 221 pp.

On the basis of a review of relevant epidemiologic experimental, and clinical data, the Advisory Committee to the U.S. Surgeon General has concluded that use of smokeless tobacco constitutes a significant health risk of cancerous and noncancerous oral conditions, can lead to nicotine addiction and dependence, and is not a safe substitute for smoking cigarettes. At least 12 million Americans reportedly used smokeless tobacco in 1985, and the number is increasing. Half of these (mostly male adolescents and young adults) are regular users. Scientific data associate the use of snuff with cancer in humans, and strongest evidence of causality is shown for cancer of the oral cavity. Excess risk of cancer of cheek and gum can reach fiftyfold among long-term snuff users. Its use can lead to development of oral leukoplakia, which can transform into dysplasia, and to cancer. Gingival recession was found to be the most common outcome among users. The smokeless tobacco products contain such potent carcinogens as nitrosamines, polycyclic aromatic hydrocarbons, and radiation-emitting polonium. Tobacco-specific nitrosamines at levels 100 times above Government-regulated levels permitted in foods have been detected in smokeless tobacco. Smokeless tobacco is addictive, leading to dependence, and has been implicated in supporting the pathogenesis of coronary artery and peripheral vascular disease, hypertension, peptic ulcers, and fetal mortality and morbidity.

86–1898. National Institutes of Health. **Health Implications of Smokeless Tobacco Use.** *National Institutes of Health Consensus Development Conference Statement,* 6(1):1-6, 1986.

Use of smokeless tobacco, particularly by children and young adults, has led to concerns about possible health consequences. National data suggest that at least 10 million persons have used smokeless tobacco of one kind or another within the past year. Patterns of use by age and sex appear to be similar across the country. Human evidence that use of snuff causes cancer of the mouth is strong. Risk is particularly high for parts of the mouth where snuff is usually placed. Data are currently insufficient for relating smokeless tobacco use to cancers at other sites. Repeated experimental studies in animals have failed to provide adequate evidence that chewing tobacco, snuff, or extracts derived from them induce cancer. However, nitrosamines chemically related to nicotine occur at high levels in snuff and, generally, at lower levels in chewing tobacco. These compounds are highly carcinogenic in animals. Concentrations of nitrosamines in smokeless tobacco are far higher than levels allowed in any U.S. food or beverage. Smokeless tobacco use increases the frequency of localized gum recession and leukoplakia where the snuff is usually placed, but evidence on its relationship to other diseases of the oral cavity is inadequate. Presence of lead in smokeless tobacco may pose a special risk for the developing fetus. Use of smokeless tobacco releases nicotine into the bloodstream and produces blood levels of nicotine comparable to those produced by smoking tobacco. Primary behavioral consequence of regular use is long-term nicotine dependence and its associated health risks. (Auth. Abs. Mod.)

86–1899. Whong, W.-Z.; Stewart, J.D.; Ong, T.-M. **Formation of Bacterial Mutagens From the Reaction of Chewing Tobacco With Nitrite.** *Mutation Research* 158(3):105-110, 1985.

Mutagenicity of chewing tobacco extracts (CTE) was tested using the Salmonella/microsome assay system. Extracts treated with sodium nitrite under acidic conditions were mutagenic in TA98 and TA100 tester strains. Mutagenicity was independent of metabolic activation. Formation of mutagenic substances by nitrite was dependent on acidic pHs (the highest at pH 2), and could be inhibited by ascorbate. Mutagenic potency of CTE plus nitrite was proportional to content of nitroso compounds generated in reaction mixture, indicating that a nitrosation process was involved. The study confirms earlier suggestions of potential health impact of in vivo-nitrosated smokeless tobacco on the gastrointestinal tract of the user. (Auth. Abs. Mod.)

See also, **86–1704, 86–1825**

TOBACCO PRODUCT ADDITIVES

86–1900. Boden, R.M.; Grim, C. **Use of Norbornyl Pyridine Derivatives in Augmenting the Aroma of Tobacco and in Flavored Tobacco Composition.** United States Patent No. 4,587,981, May 13, 1986, 26 pp.

The norbornyl pyridine derivatives described, used to augment or enhance aroma and flavor of tobacco products, are added to tobacco in amounts of 0.00005 to about 0.2 percent by weight, or less if other flavorants are included. Suspended in liquid solution, the additives are applied to tobacco by spraying or dipping during the aging, curing, and shredding processes, before the tobacco is formed into the final product. The additives are particularly adaptable to products formed from sheeted tobacco dust or fines, and are easily incorporated into the filter tip, seam paste, and packaging materials. Methods for preparing the derivatives are illustrated.

86–1901. Hass, W.; Heemann, V. **Process for the Preparation of Aromatic Substances From Diterpene Fractions.** United States Patent No. 4,600,023, July 15, 1986, 4 pp.

A process for preparing tobacco aromatic substances without employing a photo-oxidation reaction is described. Diterpene fractions, obtained synthetically by extraction from surface resin of fresh tobacco plants, from raw tobacco or tobacco waste, or from plant gum derived from tobacco blossoms, are oxidized in an environment free of photochemically active radiation. The oxidation is performed with an oxidizing agent in the presence of a catalyst. The oxidizing agent is selected from oxygen, peroxo compounds, halogenates, and periodates. The catalyst is selected from compounds of tin, lead, cerium, and transition metals of groups Ib, IVb, VB, VIb, VIIb, and VIII. (Auth. Abs. Mod.)

86–1902. Houminer, Y.; Grubbs, H.J. **Smoking Compositions.** United States Patent No. 4,592;373, June 3, 1986, 8 pp.

Tobacco and nontobacco smoking compositions containing a heterocyclic-hydroxy-substituted carboxylate compound as a flavoring additive for both mainstream and sidestream smoke are described. Smoking compositions are composed of an admixture of combustible filler selected from natural tobacco, reconstituted tobacco, nontobacco substitutes, or combinations thereof and a heterocyclic-hydroxy-substituted carboxylic acid compound between 0.00001 and 2 percent of total filler weight.

Various examples for preparing smoking compositions are included.

86–1903. Qu, D.-F. **Tobacco Composition With Bluish Dogbane and a Process for the Preparation Thereof.** United States Patent No. 4,600,026, July 15, 1986, 5 pp.

A tobacco composition comprising tobacco and bluish dogbane is described as being useful to alleviate and cure chronic bronchitis caused by smoking. Bluish dogbane, an herbal medicine known in China, contains various components such as quercetin, sterols, anthraquinone, amino acids, and other ingredients useful to reduce phlegm, relieve coughs, and improve the condition of the lungs. It is also claimed that bluish dogbane, i.e., bluish dogbane leaves and extract, mixed with tobacco of cigarettes, cigars, pipe tobacco, or chewing tobacco is an inexpensive tobacco composition with low tar and nicotine content. Processes for making the tobacco composition and for producing bluish dogbane extract are described.

See also, **86–1908, 86–1913**

86–1904. Rohr, M.; Flynn, C. **Alkyl α-Campholenates and Dihydro Derivatives Thereof As Tobacco Flavorants.** United States Patent No. 4,590,953, May 27, 1986, 6 pp.

Tobacco flavors and fragrances derived from lower alkyl esters of α-campholenic acid and α-campholanic acid are described. The preferred method for preparing the α-campholenic acid esters involves the oxidation of α-campholenic aldehyde (e.g., via Jones oxidation) to α-campholenic acid and subsequent esterification of acid using the appropriate alcohol and an acid catalyst. Alkyl α-campholenates can be hydrogenated to the corresponding alkyl α-campholanates in the presence of a metal catalyst (e.g., 5 percent Pd/C). It is claimed that when used in smoking tobaccos, ethyl esters improved quality of smoking by enhancing sensation in the mouth, or "mouth feel," providing smoother smoking, and leaving the mouth with an increased and desirable sensation of moistness. A concentration of 0.5 to 50 percent is recommended for tobacco or tobacco products such as reconstituted and homogenized leaf and stem, tobacco surrogates such as lettuce and cabbage leaf, tobacco-processing materials such as paper and filters, and flavoring substance compositions used for tobacco products.

TOBACCO MANUFACTURING AND PROCESSING

86–1905. Bordin, G.M. **Killing Forests to Cure Tobacco. (Letter).** *Journal of the American Medical Association* 255(23):3244, June 20, 1986.

Tobacco not only claims lives but also is responsible for a significant rate of demise of forests, according to an article in *International Wildlife* (January-February 1986) that claims an acre of forest must be burned to cure an acre of tobacco. Where wood is used to cure tobacco, one tree will cure tobacco sufficient for only 300 cigarettes. It is proposed that smokers be alerted by placing a fifth warning label on cigarette packs: "Smoking is directly responsible for extensive deforestation and adversely affects the world ecology."

86–1906. Dixit, A.S. **Cigarette Paper With Reduced CO On Burning.** United States Patent No. 4,590,955, May 27, 1986, 8 pp.

Cigarette wrappers with an added non-ionic surfactant are described as reducing the amount of carbon monoxide (CO) produced on burning. Cellulosic sheet material used for cigarette wrapping is coated or sprayed with a solvent solution of non-ionic surfactant, preferably (1) those produced by randomly condensing glycerol with ethylene oxide and propylene oxide and finally capping the hydroxyl ends thereof with ethylene oxide; (2) ethoxylated nonylphenol condensed with ethylene oxide (e.g., PG-2601, Olin Corp.); (3) those produced by condensing linear alcohols containing more than 10 carbon atoms, e.g., tridecyl alcohol, dodecyl alcohol, octyl phenol with ethylene oxide and, optimally, then with propylene oxide, i.e., PTS-405-LF, PTS-305-LF, PTLF-400, and PTG-300 (Olin Corp.); or (4) polyethylene glycols (e.g., Carbowax 2000, Union Carbide). It is claimed that any amount of non-ionic surfactant sufficient to reduce CO emission during burning but insufficient to affect smoking enjoyment or the esthetic appearance of the smoking article before, during, or after burning can be incorporated in the paper, depending upon non-ionic surfactant and paper base selected.

86–1907. Gabriel, N.B. **Pelleted Cigarette.** United States Patent No. 4,598,720, July 8, 1986, 4 pp.

Pelleted cigarettes using aluminum foil particles to collect tar, nicotine, and hydrocarbons by condensation are described. Porous pellets of aluminum foil centered within the length of the tobacco column, scattered throughout the tobacco column, or stuffed over the tobacco column as a mouthpiece filter for extra filtration of smoke provide the required metallic surface for condensation. Foil pellet arrangement assures adequate ventilation for the lighted cigarette while preparing a relatively cold surface for condensing most tar and nicotine inside the pores and grooves of the pellets. Illustrations of various pellet arrangements are included.

86–1908. Grigg, R.E.; Amornraksa, K. **Smoking Products Comprising Nicotine Substitutes.** United States Patent No. 4,600,025, July 15, 1986, 3 pp.

A smoking product is described comprising an inert combustible substrate to which has been applied a nicotine-substitute-effective amount of a compound selected from the group consisting of 2-methyl-5-(pyrrolidinomethyl) thiazole and 2-methyl-5-(piperidinomethyl) thiazole and the acid addition salts thereof. It is suggested that a smoking product may be in the form of a cigarette or tobacco substitute that carries, e.g., by impregnation onto an inert combustible material by conventional means, an active compound of the invention. The material may also include or carry additives, i.e., substances that aid or retard burning and/or enhance flavor. (Auth. Abs. Mod.)

86–1909. Houck, W.G.; Newsome, R.W.; Nichols, W.A., et al. **Cigarette and Method of Making It.** United States Patent No. 4,600,027, July 15, 1986, 15 pp.

An air-dilution cigarette design is described comprising a cylindrical tobacco rod and an integral, axially aligned, cylindrical assembly at the mouth end of the cigarette that includes a wrapped cylindrical filter plug and tipping paper. The cigarette is provided with a mechanism for adjusting the air dilution value. The assembly has first and second open ends to permit passage of air and smoke, and at least two other openings. The structure is designed so the smoker may rotate one opening relative to the other, thereby varying the degrees of opening registry, to permit varying amounts of air and smoke dilution. Chief advantage of the design is that the variable air-dilution cigarette can be readily manufactured on conventional cigarette-making equipment. The patent includes nine pages of illustrations. (Auth. Abs. Mod.)

86–1910. Nichols, W.A.; Newsome, R.W. **Filter Cigarette.** United States Patent No. 4,601,298, July 22, 1986, 7 pp.

A filter cigarette with an improved air dilution-varying mechanism is described. It consists of a tobacco rod, i.e., a charge of tobacco wrapped in cigarette paper; an integral, axially aligned wrapped cylindrical filter plug; and tipping paper. The filter plug is divided into first and second segments with the first segment rotatable about the second segment. Rotation of the first segment uncovers the permeable region in the plug wrapping, thereby allowing the smoker to control the amount of air dilution desired. Although the filter cigarette can be produced on conventional cigarette-making equipment, some minor modifications are required, i.e., formation of the circumferential cut in the filter, the break line in the tipping paper, and openings in the tipping paper and plug wrap. The cigarette described is claimed to be sturdier and more reliable than previous designs. (Auth. Abs. Mod.)

86–1911. Schildwachter, H. **Carbon Dioxide Expanded Tobacco.** *Tabak Journal International* 1:16, 18, February 1986.

The carbon dioxide tobacco expansion process described increases tobacco shred volume (collapsed during harvesting, curing, and storage) to give cigarettes firmness, lower filler weight, and reduce tar and nicotine delivery. The DIET process is a joint development of Airco, a major American industrial gas company, and Philip Morris, one of the world's largest tobacco companies. The process consists of (1) impregnating tobacco shred with a volatile agent (liquid carbon dioxide (CO_2)) under pressure; (2) depressurizing (to atmospheric level); (3) solidifying liquid CO_2; (4) releasing impregnated CO_2 through heat expansion, thereby causing cell walls to puff; and (5) adding moisture. Use of CO_2 (a colorless and odorless gas) is described as economical, safe, and clean. Advantages to cigarette manufacturers are (1) increased filling power (twice that of unexpanded tobacco); (2) no residue; (3) flexibility in blending and cigarette design; (4) improvement of lower-grade tobacco; and (5) no supply problems in worldwide availability of liquid CO_2.

86–1912. Seidel, H.; Wildenau, W.; Mantke, J. **Variably Ventilated Filter Cigarette.** United States Patent No. 4,593,707, June 10, 1986, 9 pp.

A filter cigarette with variable ventilation provided through rotary motion is described. The filter contains a number of spaced circumferential, peripheral channels covered by a wrapping sheet that is partially air permeable. Beyond the filter the wrapping contains a cup-shaped rotatable device that can be aligned with channels. It is claimed that the variably ventilated filter cigarette can be regulated for "milder" or "stronger" smoke without affecting flavor or aroma. Variations of the design are also discussed. (Auth. Abs. Mod.)

86–1913. Stiller, W.; Ulrich, J.; Sibbers, H. **Method and Apparatus for Producing Crimped Fibre Pieces of Reconstituted Tobacco.** United States Patent No. 4,598,721, July 8, 1986, 8 pp.

For the production of crimped fiber pieces from reconstituted tobacco, a mixture of tobacco dust and/or tobacco waste, binders, and possibly additives is extruded by a special die or nozzle head to filiform intermediate products with rectangular to slightly lenticular cross-sections. The product can be cut into five crimped fiber pieces immediately after leaving the die head. Extensive illustrations of the apparatus are provided. (Auth. Abs. Mod.)

86–1914. Townsend, D.R. **The Contribution of the Filter to Low-Tar Cigarette Design.** *Tabak Journal International* 2:102-103, April 1986.

Against a background of continuing worldwide pressure to reduce cigarette tar yields, the cigarette filter industry is investigating a variety of filter options. It is suggested that increasing demands for low-tar cigarettes will cause worldwide sales of low-tar products to double by 1990. Some filter options and their contributions to the low-tar cigarette design are discussed, such as (1) the CPF filter that combines the general characteristics of a mono acetate filter with improved tar retention per unit of pressure drop; (2) the Dual filter that consists of conventional cellulose acetate mouth-end segments and a pure cellulose segment next to the tobacco column; (3) the Bonus filter that offers flexibility in balancing ventilation, retention, and cigarette draw resistance; (4) the Ventilated Cavity filter that provides unimpeded entry of air into a specially designed cavity and maintains flavor and taste even for cigarettes with specified tar yields of less than 5 mgs; (5) the Ratio filter that provides management of carbon monoxide, vapor phase, and nicotine yields relative to tar; (6) the Flavor Thread filter that incorporates flavoring in specially developed threads; and (7) the Astra filter that separates ventilated air from mainstream smoke through full-length grooves or annular chambers.

86–1915. Weinert, F. **Cigar Cartridge With a Self Igniting Cigar.** United States Patent No. 4,597,397, July 1, 1986, 4 pp.

The self-igniting cigar is stored in a tubular cartridge divided into three sections, each secured with a sealed tape. When the sealed tape is removed, the upper section can be pulled up from the middle section, exposing the mouthpiece of the cigar and allowing the smoker to grip the cigar to remove it from the remaining cartridge. This final action triggers the ignition unit in the cigar, i.e., a flammable tube equipped with a piston attached to a string (the other end of the string is anchored to the bottom surface of the cartridge). When the cigar is removed from the cartridge, the piston is pulled from the igniting tube, thereby igniting a flammable substance that, in turn, ignites the cigar. The middle section acts as a fingertip protector and as a butt extinguisher. (Auth. Abs. Mod.)

86–1916. White, J.L.; Stowe, M.E. **Smoking Material and Method for Its Preparation.** United States Patent No. 4,596,259, June 24, 1986, 8 pp.

An improved smoking product, and its preparation from thermally degraded tobacco plant materials and water soluble polysaccharide gums, is described. The composition is suitable for blending with conventionally processed tobacco for the manufacture of smoking products with reduced levels of nicotine and total smoke particulate matter. The material requires no special agents to control the combustion process. The patent also claims that the smoking material comprised of pyrolyzed tobacco materials and an adhesive agent is less harsh than usual reconstituted tobacco materials.

See also, **86–1641**

TOBACCO ECONOMICS

86–1917. Beljo, J. **Rapid Growth of Burley Production in Yugoslavia.** *Tabak Journal International* 2:144, April 1986.

Production of Burley tobacco in Yugoslavia is characterized by small farms, a great number of growers, and inadequate curing facilities. Although production of Burley is a supplementary occupation, growers in 1984 produced 13,320 tons, or 16 percent of the total Yugoslavian crop, and it is anticipated that 1985 production will reach 15,000 tons, or 20 percent of total Yugoslavian yield. Domestic demand averages between 8,000 and 10,000 tons. Burley is used in almost all Yugoslavian cigarettes with blends of 10 to 25 percent. The oriental character of Yugoslavian cigarettes is disappearing as new blends of Virginia, Burley, oriental, and semi-oriental tobaccos take precedence. It is anticipated that before long cigarettes will be entirely American blend. In 1984, Burley was grown on 21,953 farms, most of them very small and averaging 34 hectares. The farm sizes are not changing, but more land per farm is being used for Virginia and oriental production. Yields of Burley tobacco are still comparatively low at 1,700 to 1,800 kg per hectare. Because Burley is grown by families without employing external labor, production is very profitable and farmers receive cash for the tobacco. The future of Burley cultivation will primarily depend on the quality of tobacco, and to this end, the Yugoslavian Government is encouraging growers to update their growing and curing methods.

86–1918. Chesterfield-Evans, A. **A Civil Disobedience Movement Against Cigarette Advertising (B.U.G.A. U.P.).** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 75-79.

A strong national tendency to sympathize with the underdog and to admire those who tackle great odds is giving an Australian activist group with the irreverent name of BUGA-

UP almost unlimited support in its battle against smoking. BUGA-UP (Billboard Utilizing Graffitists Against Unhealthy Promotions), originally formed to counter billboard advertising, has concentrated its attacks on frequent billboard advertisers of tobacco and alcohol products. Arrests have been infrequent because the public is reluctant to report BUGA-UP activities to police despite advertisers' attempts to portray the graffitists as vandals and hooligans costing the advertising industry hundreds of thousands of dollars annually. Those arrested have been acquitted when charged with "malicious damage" because the definition of malice involved "indifferences to human life and suffering," an attitude more readily attributed to billboards before refacing than to graffitists. Other described BUGA-UP activities have prompted support from health and legal professionals. Cigarette advertising in Australia is controlled by a system of self-regulation. BUGA-UP supporters claim that industry advertising of tobacco products shows a lack of both responsibility and credibility.

86–1919. Dibold, H. **Sales of Tobacco Products in Austria Remain Steady.** *Tabak Journal International* 2:140, 142, April 1986.

Sales in Austria last year increased 0.6 percent in quantity to 15.64 thousand million cigarettes. Cigarettes represented 96.8 percent of the overall turnover. Memphis Light, marketed for the first time in September 1985 after more than 2 years in development by Austria Tabak, took 7.85 percent share of the market. It ranked fifth among the top 10 leading brands, 5 of which are produced by Austria Tabak. The five most important brands enjoy a market share of 58 percent. Memphis Light was selling at the rate of 30 million cigarettes per month, making it the most successful new brand produced by Austria Tabak since 1945. While cigars declined in sales by 4 percent, sales of snuff and pipe and chewing tobaccos remained at 1984 levels, i.e., pipe tobacco, 168 tons; snuff, 7.2 tons; and chewing tobacco, 0.9 tons. Smoking habits of Austrians provided the Minister of Finance with tobacco duty and value added tax amounting to 13.3 thousand million shillings. It is anticipated that 1986 sales will equal that of 1985.

86–1920. Ernster, V.L. **Selling Cigarettes: How Women Are Used.** In: Forbes, W.F.; Frecker, R.C.; Nostbakken, D. (Editors). Proceedings of the 5th World Conference on Smoking and Health, Winnipeg, Canada, 1983, Volume 2. Canadian Council on Smoking and Health, 1983, pp. 89-93.

In directing much of its contemporary advertising to the female market, particularly to the working woman, the tobacco industry is employing unique marketing themes and cleverly crafted cigarette promotions to persuade through suggestions of seductiveness, excitement, fun, slimness, independence, ambition, and self-indulgence. Women's magazines constitute a major vehicle for cigarette advertising directed at women. *Ladies Home Journal, McCall's,* and *Redbook* received over 15 percent of advertising revenues in 1981 from cigarettes; other magazines received lower but still substantial revenue from cigarette advertising accounts. Mean number of cigarette advertisements/issue ranged from 5 to 16. Notable exceptions were *Good Housekeeping* and *Seventeen,* which do not accept tobacco advertising. Studies have indicated that some women's magazines that accept advertising for cigarettes do not adequately report on the health hazards of smoking. It is concluded that all cigarette promotions should be banned; alternatively, all promotions attempting to associate social strides made by women with a product like cigarettes, whose users are victims, should be publicly condemned by women's groups.

86–1921. Field, A.D. **Burley Tobacco in Zimbabwe.** *Tabak Journal International* 2:92-94, April 1986.

The future of Zimbabwe's Burley tobacco industry hinges on future pricing policy, a decentralized market, and Zimbabwe remaining competitive on the world Burley market. Grower and merchant sources have hinted at a 15 to 20 million kilogram Burley industry in 10 years, but this seems to be stifled by an imbalance between what prices growers think they should get (relative to producer cost inflation) and the prices that allow the consortium to sell Zimbabwe Burley competitively on the world market. Burley tobacco was grown in Zimbabwe as long as 60 years ago, but it was not until the early 1950s that it was considered a reasonably viable crop to produce on a large scale. Marketing of the crop evolved from private treaty sales, through auction sales to the two-party merchant consortium that has operated for the last 10 years by purchasing the crop on a fixed grade price system. A major criticism of grade price tobacco marketing is that it fails to adjust prices spontaneously to domestic or world supply and demand. Production levels have peaked and troughed in response to apparently unstable prices. Negotiated incentives raised the national average price by 71 percent between 1980 and 1981 selling seasons, and production increased from a low 2 million kilograms in 1980 and 1981 to a peak of 5.2 million kilograms in 1983 and 1984. However, the incentive program was not sustained. Zimbabwe Burley production for the 1985-1986 season was estimated at 2 million kilograms.

86–1922. Gooch, P. **Demand for Good Leaf Prompts Early Sales.** *Tobacco Reporter* 113(6):26-28, June 1986.

The United States continues to be the single biggest customer for Turkish tobacco, absorbing about 58 percent of total leaf exports in 1985. Unmanufactured tobacco exports in 1985 were 102.7 million kilos valued at 330.1 million U.S. dollars, compared with 1984 exports of 69.7 million kilos valued at 216.3 million U.S. dollars. Other large purchasers were Japan, the Soviet Union, France, and Spain. Exports this year are currently estimated at around 80 million kilos, representing 250 million U.S. dollars. Leaf production is anticipated to increase in 1986 (149,400 metric tons, projected) over that of 1984 or 1985. Total production of filtered and nonfiltered brands is anticipated to drop slightly this year. About 4.1 billion cigarettes were imported in 1985, representing about 6.6

percent of total domestic production. American cigarettes (particularly Marlboro) hold the biggest share in imported cigarettes, representing more than 75 percent of total imports. Plans for 1986 indicate an import level of about 6 billion cigarettes, nearly 10 percent of domestic output. Growing demand for American cigarettes has prompted the Turkish cigarette monopoly to consider increasing imports of flue-cured tobacco and allowing private manufacture of foreign brands.

86–1923. Harman, A. **New Import Tariffs Disappoint Growers.** *Tobacco Reporter* 113(6):38, 40, June 1986.

New Zealand tobacco growers, unhappy with new import tariff rules established by the government, are also smarting from antismoking attacks. New Zealand's new import tariff rules, resulting from restructuring of the tobacco industry, will (1) raise the threshold price to 12 (N.Z.) dollars/kg, with regular review to keep pace with market trends; (2) allow flavor leaf to enter free of tariff; (3) reduce the ad valorem tariff from 25 to 12.5 percent for leaf falling below the threshold; (4) reduce the current tariff rate on cigarettes and other manufactured tobacco from 35 to 20 percent, and remove import licensing on these products by 1989; and (5) abolish manufacturers' access to cheaper Reserve Bank credit to buy local leaf. The government claims that farmers will be better protected by the lower rates, but growers fear an inability to compete against Third World countries and are arguing for higher tariffs or lower costs of production. Anti-tobacco forces' targeting of industry sponsorship of sports, estimated at about 4 million (N.Z.) dollars annually, is adding to tobacco industry problems. Action on Smoking and Health is pushing for a special tax on tobacco products to offset this sponsorship revenue.

86–1924. Max, A. **Uruguayan Tobacco Production and Consumption Declined.** *Tabak Journal International* 1:20-21, February 1986.

Sales of cigarettes in Uruguay dropped 25 percent to 168,600,000 packs during 1983-1984, and statistics for the first half of 1985 showed that consumption was reduced to an annual level of 150,000,000 packs. The decline in production and consumption was attributed to (1) progressive recession, (2) excessive taxation, and (3) inadequate measures against smuggling. Uruguay's recession may be helped by international efforts to achieve an economic recovery in developing South American countries. The new democratic government reduced the high level of taxation from 50 to 25 percent near the borders with Argentina and Brazil to discourage smuggling, and from 62 to 35 percent elsewhere. The fiscal measures, despite recession, have quadrupled the sales of cigarettes (based on statistics for August and September 1985), discouraged the flow of duty-free cigarettes into Uruguay, and substantially increased national revenue. Uruguay produces approximately 1,800 tons of tobacco annually on about 250 family-run farms of two, three, or four hectares. It is estimated that about 4,000 people, including harvesters, are employed in tobacco cultivation, some 700 workers are engaged in tobacco processing, about 500 people in wholesale trade, and about 5,000 people in the retail side of the industry.

86–1925. Max, A. **High Taxation and Government Control Handicap Argentinian Cigarette Industry.** *Tabak Journal International* 2:106, 108, April 1986.

Three-quarters of the retail price of every pack of cigarettes sold in Argentina flows into government coffers. The South American country with a population of 30 million and foreign debts totaling almost 50 billion dollars has imposed an extraordinarily high level of taxation on the country's cigarette industry to help offset national economic problems. The crippling tax burden of 75 percent, compared with the national average of 18.51 percent in 1984, is not the only problem facing the Argentine tobacco manufacturing and processing industry. The price and wage freeze policy established as an economic control is beginning to waver, and another inflationary spiral threatens to break loose. The government permitted cigarette manufacturers to raise their prices by only 430 percent, compared with a 688 percent rise of the dollar on the official rate of exchange (1984) and an average wage increase of 734 percent for the industrial worker. Despite this, Argentina's cigarette industry investments in 1984 amounted to 2,503 million pesos (U.S. 15.6 million dollars), and although the cigarette industry suffered considerable losses in 1984, it was still able to contribute 1.11 percent to the country's gross national product. The tobacco industry employs 358,604 people, representing 3.6 percent of the country's working population.

86–1926. Naguib, M.R. **Increased Cigarette Production and Exports in Egypt.** *Tabak Journal International* 2:96, April 1986.

Egypt's Eastern Company is easily covering total local tobacco market requirements and has doubled its exports as a result of incorporating two public sector tobacco companies. The only cigarette manufacturer in Egypt (the private sector produces only small amounts of other tobacco products), Eastern sold 46 thousand million cigarettes by June 1985, or 5.1 percent more than were sold the previous year. Eastern's exports more than doubled during 1984-1985 to a value of L.E. 15.5 million, mostly from additional exports to Iraq and new markets in Belgium, Tunisia, North Yemen, Jordan, and France. Egypt's main export markets are Saudi Arabia, Kuwait, Dubai, Qatar, Tunisia, Cairo Airport, and the Suez duty-free area. Eastern is planning to open other markets in Bangladesh, Morocco, Tunisia, Iraq, Turkey, and Yugoslavia for surplus production of filter rods, hoping to import leaf tobacco at the same value. Eastern's production capacity, about 180 million cigarettes/day, exceeds daily domestic demand by about 30 million cigarettes. Seven million of the daily surplus is prepared for export and the remainder is used for production of eight foreign brands manufactured by special arrangement with four international cigarette companies (Philip Morris for Marlboro and Merit, Reynolds for Camel and Winston, B.A.T.

and B and W for Kent and DuMaurier, and Rothmans for two Rothman brands.)

86–1927. Neuber, D. **A Year of Change for the US Cigarette Industry.** *Tabak Journal International* 1:29-30, February 1986.

The U.S. cigarette industry has instituted a number of organizational and legal changes (i.e., restructuring corporations, diversifying into nontobacco sectors, and selling off nonproductive businesses), prompting some analysts to suggest that these are the result of increases in antismoking sentiment and attention to pending product liability suits. Other analysts contend that tobacco companies have excess cash that was used in the 1960s to make acquisitions and in the 1980s to diversify. Philip Morris was recently organized into a holding company structure to produce "a clearer delineation, separation, and understanding of the company's businesses." The American Tobacco Company recently became a separate subsidiary, and a new holding company structure for American Brands and its subsidiaries was also established. R.J. Reynolds and Philip Morris have diversified into nontobacco concerns, while Grand Metropolitan, parent company of Liggett and Myers Tobacco Company and the Pinkerton Tobacco Company, sold the latter to the Swedish tobacco monopoly for 137.8 million dollars. In terms of sales, 1985 witnessed a small decline with no major changes in leading brand shares.

86–1928. Pickvance, J. **The Tobacco Industry Fights Back.** *Tabak Journal International* 2:89-90, April 1986.

The tobacco industry is asserting its position against antismoking forces with arguments that (1) advertising has not been proved to increase consumption or to persuade nonsmokers to smoke; (2) a ban on smoking will lead to a rise in income taxes and loss of jobs; and (3) adults are exercising their freedom of choice to smoke. The Tobacco Advisory Council (TAC), the British tobacco manufacturers' trade association, is working with industry to protect the smoker's right to smoke. The Tobacco Alliance, a self-described "communications network for the tobacco family and its allies," generates protobacco industry argumentation for media and members of Parliament through surveys conducted by FOREST (Freedom Organization for the Right to Enjoy Smoking Tobacco). In the United States, the Tobacco Grower's Association has launched a campaign on the theme "Smoking is a custom not a crime"; slogans (e.g., "My pleasure, my choice") adorn T-shirts, coffee mugs, and other convenient message carriers. The R.J. Reynolds company is publicizing that (1) smoking should be openly debated; (2) passive smoking needs more positive facts; (3) nonsmokers should be tolerant of smokers; (4) juveniles should not smoke; and (5) smokers should not smoke in bed. Information, newsletters, and periodicals supporting the U.S. tobacco industry are the work of the Tobacco Institute. Infotab, an international organization representing some 40 countries, keeps a low profile but is readily available to provide pro-tobacco propaganda for any of its members.

86–1929. Qazi, M.Z.; Khan, B.A.; Quddus, M.A. **Economics of Dark Virginia (DV) Tobacco Production in Punjab.** *Pak Tobacco* 8(1):5-10, January 1984.

Dark Virginia tobacco is an important cash crop in tobacco growing areas of the Punjab Province, contributing up to 38 percent of growers' crops. A cost/income analysis of farm cost vs. crop yield on sampled farms revealed that farming and curing costs contributed 74.9 percent to the total cost of production, thereby having a considerable effect on net income. Net incomes varied extensively among the study centers. Growers in the Okara area obtained higher yields/acre and derived higher benefits in spite of low weighted average prices compared with Gujrat areas where prices were better but yields/acre were lower. It is concluded that growing Dark Virginia tobacco in Punjab is a profitable proposition, compared with growing other crops. However, it is recommended that efforts be made to minimize expenditures of farming and curing through introduction of small tools, implements, and modern farm technology.

86–1930. Quatraro, A.; Seuss-Calandrelli, D. **Asia Important for the European Tobacco Industry.** *Tabak Journal International* 2:84-85, 88, April 1986.

Asian markets represent promising outlets for the European sector of the tobacco industry, ranging from supply of processing and market preparation machinery to cigarette manufacturing machinery and from development of research operations to sale and distribution of manufactured products. An increase of 5 percent in future exports to Asian markets is anticipated by the European Tobacco Commission, offsetting the gradual decline in consumption of manufactured tobacco elsewhere and compensating for those European markets now glutted and subjected to fierce competition. Significance of the European tobacco industry in terms of employment, wages, and tax revenue is emphasized. Within the European Economic Community (EEC) of 12 countries (including Spain and Portugal), the tobacco industry employs some 1,800,000 people, including 510,300 in Greece and 460,700 in Italy. Tax revenue from various sources connected to the tobacco industry amounts to about 36,000 thousand million lire (24,172 million ECU), representing 4.5 percent of total tax revenue of the 12 EEC countries. This revenue in the past few years has been rising more quickly than revenue from taxes on any other products.

86–1931. Seuss-Calandrelli, D. **The Italian Tobacco Monopoly Worried About Progress of Foreign Brands.** *Tabak Journal International* 1:14-15, February 1986.

Increased sales of foreign cigarettes, particularly Marlboro, are worrying the Italian Tobacco Monopoly despite its lead in the domestic market. Foreign cigarette sales peaked in 1979 at 40 percent of market shares, dropped to 33 percent in 1983, and rose to 36 percent in 1984. A drop of another 4 percent to foreign brands in the first 9 months of 1985 resulted in a loss to the Azienda di Stato (the Italian Monopoly concern) of approximately 30 thousand million lire. Total 1984 sales of tobacco products amounted to 105,960,263 kilos, an increase of 2,009,284 kilos (1.9 percent) over 1983. Of this, 67,943,707 kilos were Italian products (64.1 percent market share), 29,198,415 kilos were imported foreign products (27.6 percent), and 8,818,141 kilos were tobacco products manufactured under license (8.3 percent). Cigarettes constituted 98.4 percent (104,283,182 kilos) of total sales, and of this, 66,904,348 kilos were of Italian origin, 28,563,851 kilos were imported foreign cigarettes, and 8,814,983 kilos were cigarettes manufactured under license. Future plans of the Italian Monopoly include manufacturing cigarettes with lower nicotine and tar content (except light and super-light brands), improving filters, and introducing new brands to deter advances of foreign brand cigarettes.

86–1932. Tabak Journal International. **Profile of the Canadian Tobacco Industry.** *Tabak Journal International* 1:36, 38, February 1986.

Cigarette consumption in Canada declined in 1984 for the third consecutive year, a drop attributed to increased consumer awareness of smoking issues and increasing retail cigarette prices. In 1985, sales are expected to decline to 60 thousand million pieces. Canada is among the top 12 tobacco-growing countries of the world and in the top 6 in terms of production of flue-cured tobacco. Ontario flue-cured tobacco represents over 90 percent of the entire Canadian crop, and 100 percent of the export crop (about 40 percent of total production). Principal export areas include the European Economic Community, the United States, and the Middle East. Of total flue-cured tobacco grown in Ontario, 77,062,035 kg were sold. Total production of Quebec flue-cured for 1984 reached 7,237,790 kg, averaging 2,300 kg/ha. In 1984, 26,238,154 kg of tobacco were exported and 2,185,365 kg imported. The largest supply of leaf is imported from the United States (about 1,771,112 kg in 1984). The nine cigarette manufacturing plants (six in Quebec and three in Ontario) produced 59.8 thousand million pieces in 1984, compared with 63.1 thousand million pieces in 1983. Four cigarette companies occupy virtually all of the Canadian marketplace: Imperial Tobacco Ltd., Rothmans of Pall Mall Canada, RJR-McDonald, and Benson and Hedges Canada.

86–1933. Tabak Journal International. **Statistics. Imports of Unmanufactured Tobacco for Selected Countries in Tonnes.** *Tabak Journal International* 2:158-165, April 1986.

World imports of unmanufactured tobacco totaled 1,303,326 tons (t) in 1985, while exports amounted to 1,405,643 t. Europe led the world with 781,746 t in imports and 361,137 t in exports. Large volume European importers were the Federal Republic of Germany (152,000 t), the United Kingdom (125,150 t), the Netherlands (80,000 t), and the U.S.S.R. (70,000 t). Largest volume European exporters were Greece (108,000 t), Italy (90,000 t), and Bulgaria (64,700 t). The United States was the largest tobacco importer (210,000 t) and exporter (235,000 t) in North America and in the world. Japan led Asian countries in imports (67,000 t), and India (85,000 t), Turkey (75,000 t), and Thailand (40,000 t) led in exports. In Africa, Egypt was the largest importer (52,000 t), while Zimbabwe (105,000 t), and Malawi (65,000 t) were the largest exporters. South American imports were relatively minor, although Brazil was among the world's largest volume exporters (170,000 t). China led the world in tobacco production (1,770,000 t), followed by the United States (670,450 t), India (450,000 t), Brazil (388,000 t), Turkey (196,000 t), Bulgaria (155,511 t), Italy (155,000 t), Greece (138,960 t), Indonesia (128,000 t), Zimbabwe (121,050 t), and Japan (121,020 t).

86–1934. Taha, A.; Ball, K. **Tobacco and the Third World: The Growing Threat.** *East African Medical Journal* 62(10):735-741, October 1985.

Smoking is becoming an acceptable social habit among many Third World people. In some parts of India, South America, and the Philippines, more than 70 percent of people smoke. Over the past two decades, the Third World has been a site for growing tobacco production and consumption. Between 1960 and 1975, tobacco production increased fivefold in Africa and forty-sixfold in South America, compared with thirteenfold in Western Europe. Consumption of cigarettes is increasing so rapidly in Third World countries that governments have established their own tobacco industries to meet ever-increasing demands. Smoking-related diseases such as lung cancer, coronary heart disease, and peripheral vascular disease, have already begun to appear; an epidemic of smoking-related diseases is expected to occur in the Third World before the end of this century. Many countries are becoming economically dependent on tobacco. At present, tobacco is cultivated in 90 Third World countries. The acreage allotted to tobacco in 1980 was three times that in the developed world. Cigarettes are heavily promoted, while health education on hazards of smoking or antismoking movements has hardly begun. The Third World tobacco industry is dominated by seven of the largest Western tobacco companies. The World Health Organization has recommended that Western governments curtail exports of cigarettes to the Third World, and that governments of Third World countries substitute food crops for tobacco. A ban on cigarette advertising and promotion, health warnings on tobacco products, a ban on smoking in public places, and restriction on cigarette sales to children have also been recommended.

86–1935. Tapper, A. **Modest Increase in Kenyan Cigarette Sales.** *Tabak Journal International* 2:135, April 1986.

Kenya, self-sufficient in tobacco leaf production, has expanded exports of Kenyan-made cigarettes from 37.3 million in 1980 to over 500 million in 1985. B.A.T. Kenya Limited, the only tobacco manufacturer in Kenya, caters to the domestic market and also exports cigarettes to Somalia, Sudan, Djibouti, and Rwanda. Cigarette sales leveled at 5001.4 million in 1984, and are described as having "increased modestly" in 1985. The Kenyan domestic market was depressed in 1984 and part of 1985 as a result of the worst drought in 50 years, causing food shortages, and the ensuing famine. More than 13 different brands of cigarettes are produced and consumed locally, but taste tends toward Virginia-type, flue-cured tobacco, accounting for 70 percent of domestic sales. Most cigarette sales, including the lighter and more expensive filter cigarettes, are by the "stick," i.e., single cigarettes sold separately and not in packs. About 15 percent of the adult population smokes, compared with 30 percent in developed countries. Last year, Kenya introduced the duty-free sale of its cigarettes, an indication that domestic brands have become popular with its citizens. Further expansion of the market requires lower prices, a variety of options (including low-tar cigarettes), and guaranteed good distribution. About 20 percent of all tobacco consumed in Kenya is homemade tobacco.

86–1936. Tobacco International. **RJR. Tobacco International Now "Leaner and Stronger" in Global Activities.** *Tobacco International* 188(5):18, 20, March 7, 1986.

R.J. Reynolds (RJR) Tobacco International, one of the largest and fastest growing international cigarette companies, markets more than 50 brands in 160 countries and territories, operates 9 manufacturing facilities overseas, and produces cigarettes through a network of 20 licensees and joint venture partners around the world. Camel, Winston, and Salem are among the top 10 best-selling brands worldwide. With an increase in volume of 2.5 percent to nearly 87 billion units in 1985, RJR outperformed the international tobacco industry. Camel, the company's global brand, led the growth in popularity of American-blend cigarettes in overseas markets. Winston was a strong performer in Spain and Puerto Rico, while Salem became the world's fastest growing menthol cigarette owing to its performance in the Far East. During 1980, when RJR joined with the People's Republic of China, Camel Filters became the first foreign cigarette to be manufactured in China. A more recent agreement was finalized to construct a cigarette factory in Xiamen that will produce a joint RJR-Chinese brand. In late 1985, RJR completed a new 20-year agreement with the Spanish tobacco monopoly that will make Camel Filters available in Spain at prices competitive with local brands.

86–1937. Tobacco International. **RJR. A Global Brand, Camel Gains in the International Market.** *Tobacco International* 188(5):42-43, March 7, 1986.

Camel and Camel Filter have been established as R.J. Reynolds (RJR) Tobacco International's global brand. During 1985, Camel posted share gains in 9 of its top 10 markets and increased volume by 7 percent to 26 billion units. Having made Camel its top priority, RJR has focused sharply on a variety of programs and promotions consistent with the "Camel World" advertising campaign. The campaign associates the Camel name with a unique, masculine world of adventure and independence, and can be seen on billboards, cinema screens, newspapers, and magazines around the world. Advertising in international editions of *Time*, *Newsweek*, and the *International Herald Tribune* will be expanded for even wider international exposure and complemented by such special promotions as the World Cup soccer meet in Mexico City and the Camel Trophy four-wheel off-road driving competition, both world-renowned sports events. RJR Tobacco International introduced its Camel brand in Turkey and in Egypt during 1985, and is charting future growth in such African markets as Senegal, Cameroon, and Nigeria. The Camel brand also has a strong foothold in China and Japan, providing RJR with longer-term prospects in the major markets of Asia.

86–1938. Tobacco International. **World's Largest Tobacco Factory Unites Past Glory, Future Growth.** *Tobacco International* 188(5):7-8, March 1986.

Combined domestic and international tobacco sales of R.J. Reynolds Industries (one of the world's great conglomerates) increased 2.8 percent to 8.1 billion dollars in 1985, and earnings from operations rose 14 percent to 1.5 billion dollars. The R.J. Reynolds Tobacco Company also achieved record sales and earnings from operations in 1985. Its earnings from operations increased 13 percent on sales that were 3.7 percent higher than those in 1984. Reynolds Tobacco's 4 best selling brands (Winston, Salem, Camel, and Vantage) continued to perform well in 1985, and as 4 of the country's top 10 brands, they play a key role in maintaining RJR's strong position in the tobacco industry. A prime contributor to the 1985 market share was Doral, the country's first branded cigarette that sells at prices competitive with generics. Although Doral receives little advertising support, the brand has attracted a 1.2 percent share of the market. Another successful RJR product is Century, the first brand to offer U.S. smokers 25 cigarettes for the price of 20. Ritz, the first U.S. cigarette associated with a world famous designer, proved highly successful in a test market introduction in 1985, particularly with women smokers. The Company's Tobaccoville, N.C., manufacturing complex, aimed at becoming the low-cost supplier of cigarettes to the U.S. market, is described.

86–1939. Tobacco International. **Technical Leadership, Innovation Keep Reynolds Tobacco in the Fore.** *Tobacco International* 188(5):14, 16, March 7, 1986.

A 10-year modernization program of R.J. Reynolds' production facilities in Winston-Salem (N.C.) now under way promises to give the company a quality, low-cost product and manufacturing flexibility well ahead of any company in the tobacco industry. By 1990, at a cost of 2 billion dollars, it is claimed that R.J. Reynolds will be unmatched in tobacco manufacturing technical capability worldwide. Plans call for highly automated production facilities and a capability to produce 110 billion cigarettes/year. By the end of 1986, more than 55 percent of the company's cigarettes will be made on the new equipment. A primary tobacco blending and processing building will be added to the production complex, and a 432,000 sq. ft. cold storage warehouse will be expanded to maintain 10 billion cigarettes fresh almost indefinitely. In 1985, a new research and development facility was opened that includes some of the most advanced technical complexes in the industry and a wing devoted to manufacturing technology and tobacco processing. Record sales from its domestic operations in 1985 and a continuing rising trend over the past few years have encouraged R.J. Reynolds' expansion and modernization prospects. Winston, Salem, Camel, and Vantage (the company's top brands) have played a key role in maintaining the company's strong sales position in the tobacco industry. Doral, a generic brand, and Century, the first brand to offer 25 cigarettes/pack, have also contributed to the company's sales successes. A new brand, Ritz (the first U.S. cigarette associated with a world-famous fashion designer), was introduced in April.

86–1940. WHO Chronicle. **Tobacco—Its Role in the Economy and the Health of African Countries.** *WHO Chronicle* 39(3):104-106, 1985.

Members of the World Health Organization (WHO) African Region meeting in Zambia suggested data collection, public information and education, and legislation as positive steps to counteract the tobacco threat to health in developing countries. The issue of smoking and health is complicated in some African countries because tobacco is grown commercially for foreign exchange through export or for Government revenue from internal sales on the home market. Use of noncommercially produced tobacco in the form of cigarettes, chewing tobacco, and snuff is also widespread. Bladder cancer from tobacco tars and hazards to unborn children of pregnant women who smoke are discussed as health risks of special significance to Africa. Economic arguments against growing tobacco are (1) tobacco requires land that could otherwise be used to produce much needed food; (2) curing tobacco leaves requires burning fuels that often lead to deforestation, soil erosion, and desertification. It was suggested that African governments could maintain their income from tobacco by raising the taxation rate in proportion to decreasing sales. WHO has produced guidelines for conducting smoking surveys, for promoting health education, and for disseminating health information. Banning tobacco advertising, prohibiting sales of tobacco to children, labeling all cigarette packs with health warnings, and increasing the price of cigarettes were suggested legislative methods for curtailing smoking in developing countries. Research on suitable substitute crops for tobacco was discussed along with methods for making the transition.

LEGISLATION

86–1941. Federal Trade Commission. **Report to Congress. Pursuant to the Federal Cigarette Labeling and Advertising Act. 1984.** Federal Trade Commission, 1986, 28 pp.

The latest report in a series on cigarette advertising that the Federal Trade Commission (FTC) has been submitting to Congress since 1967 pursuant to the Federal Cigarette Labeling and Advertising Act, the annual report includes current practices and methods of cigarette advertising and promotion and recommendations for appropriate legislation as authorized by a 1984 amendment to the Act. Included in the introduction is a discussion of the Barclay controversy that culminated in 1983 with the Commission suing in the U.S. District Court for the District of Columbia to enjoin Brown and Williamson Tobacco Company from advertising its Barclay cigarette as a 1 mg tar cigarette or from using any tar number not specifically approved by the FTC. Trends in cigarette marketing during 1984 include generic cigarettes, discount brands, premium price cigarettes, and cigarette advertising and health issues (e.g., R.J. Reynolds' advertisements addressing key issues on smoking and health, passive smoking, and such social issues as smoking in bed, adolescent smoking, and smoker-nonsmoker courtesy). Statistical data summarizing domestic cigarette sales and advertising activities for 1963 to 1984 are also provided.

86–1942. General Services Administration. **Smoking Regulations.** Federal Register (41 CFR Part 101-20) 51(99):18805, May 22, 1986.

This regulation provides for revised smoking regulations in buildings controlled by the General Services Administration (GSA) because (1) smoke in a confined area may be irritating and annoying to nonsmokers, and (2) the Office of the Surgeon General has indicated that current scientific evidence suggests that exposure to ambient tobacco smoke can be hazardous to nonsmokers and may create a potential hazard to those suffering from heart and respiratory diseases or allergies. The GSA recognizes the right of individuals to smoke in such buildings provided such action does not cause discomfort or unreasonable annoyance to nonsmokers or infringe upon their rights. The regulation is intended to provide a reasonably smoke-free environment for those working and visiting GSA-controlled buildings. Generally, smoking is prohibited in general office space, auditoriums, classrooms, conference rooms, elevators, corridors, lobbies, restrooms, medical care facilities, libraries, and hazardous areas. Smoking is permitted in designated smoking areas identified with appropriate signs in such areas as cafeterias and food vending stations. Smoking areas must be provided with ash trays, and must be identified with suitable signs placed on or near entrance doors. A private office may be declared a smoking area. Regulations do not authorize expenditures for structural changes to accommodate the preferences of nonsmokers.

86–1943. Hatch, O.G. **Legislative Action on Tobacco and Smoking. (Letter).** *Journal of the American Medical Association* 255(23):3244, June 20, 1986.

The Federal Cigarette Labeling and Advertising Act of 1965 was amended in 1982 to strengthen health warnings. After 3 years of intensive legislative activity, a series of hearings, executive sessions, and floor debate in both the House and Senate, the legislation was unanimously approved by Congress and signed into law. Legislation that places three strong health warnings on smokeless tobacco products and that regulates advertising was introduced in 1986, approved by Congress, and recently signed into law by the President. In addition, the 16-cent tax on cigarettes has been permanently extended. Other measures before Congress that could substantially affect the tobacco industry are (1) legislation that would restrict smoking in Federal buildings (S 1937); (2) legislation that would end the tax deduction for advertising expenses for tobacco products (S 1950); (3) legislation to ban smoking on all public conveyances, e.g., airplanes, trains, and buses; and (4) legislation to increase the current tax on cigarettes from 16 to either 24 or 32 cents. The Secretary of Defense, urged by members of Congress to halt cigarette sales in military commissaries and to raise cigarette prices in military exchanges, is currently developing programs to achieve a smoke-free military by the year 2000.

86–1944. Prices Surveillance Authority of Australia. **Prices Surveillance Act 1983. Inquiry in Relation to the Supply of Cigarettes.** Prices Surveillance Authority (Australia), Report No. 6, Matter Number PI/85/2, November 26, 1985, 66 pp.

The Australian authority for price surveillance, disapproving cigarette price increases requested by the tobacco industry, proposed instead a 0.5 percent average reduction of current prices charged by four companies (i.e., Philip Morris, Wills, Rothmans, and Reynolds), with implementation to begin with the next round of cost-based price notifications. It was also proposed that a deduction of interest related to excise over recoveries be implemented at succeeding excise reviews for the four companies, and that the Authority continue surveillance of cigarette prices under Section 21 of the Prices Surveillance Act of 1983. A comprehensive review of tobacco industry activities in Australia in the last decade is provided as background information for the Authority's consideration, including such topics as demand for cigarettes, tobacco leaf growing, production, investment, industry employment, cigarette distribution, competition, company profits, cash flow, pricing bases, and recent pricing considerations.

See also, **86–1855, 86–1925**

GENERAL

86–1945. Craig, M.E. **Smoking: Our Business, Our Responsibility. (Letter).** *Minnesota Medicine* 69(1):5, January 1986.

Tobacco use is estimated to increase the direct costs of health care in Minnesota by 374 million dollars/year, or 80 cents/pack of cigarettes sold in the state. Across the country, more than 1,000 people die each day as a result of tobacco use. A recent survey showed that more than 60 percent of tobacco users would stop or seriously try to stop using these products if their personal physician recommended and supported such an effort. The Minnesota Medical Association has formed the Coalition for a Smoke Free Society by the year 2000 and the American Medical Association has spoken out with a stronger voice about tobacco use. However, the role of a physician as the patient's advocate requires voicing concerns about smoking to individual patients as well as to the public as a whole. The adversary, the tobacco industry, is powerful and patients are vulnerable. It is the business of physicians to counsel patients about tobacco use and to challenge each colleague who is still smoking. Every physician must work to counter efforts of the tobacco industry, particularly their tantalizing appeals to seduce youth.

86–1946. Grunberg, N.E. **Nicotine, Cigarette Smoking, and Body Weight.** *British Journal of Addiction* 80(4):369-377, December 1985.

Cigarette smokers weigh less than nonsmokers of the same age, and many smokers who give up cigarettes gain weight. Recent animal and human studies suggest that changes in specific food consumption may contribute to the inverse relationship between nicotine and body weight and between cigarette smoking and body weight. Some smokers continue to smoke to avoid gaining weight. It is important to examine the nature and cause of the relationship since an inverse relationship between cigarette smoking and body weight may deter smoking cessation and may even encourage some people to begin smoking. Smoking/body weight relationship, possible explanations, relevant research, and implications of nicotine and specific food consumption are reviewed. (Auth. Abs. Mod.)

86–1947. Harrell, O.E. **Why Not Pass the Buck? (Letter).** *Journal of the Florida Medical Association, Inc.* 73(2):100-101, February 1986.

"Those who want to smoke and enjoy it should do so" (*Journal of the Florida Medical Association* December 1985) is not what a responsible physician would say to anyone, considering the injuries sustained by the human body as a result of smoking. When they smoke, smokers are passing the buck to (1) retarded persons born because mothers smoked during pregnancy, and to others born prematurely with damaged brains or with susceptibility to disease that damages the brain; (2) the taxpayer who must shoulder the cost of medical expenses (Medicare and insurance) to care for poor victims of cancer, emphysema, coronary disease, and other smoking-related diseases; and (3) children who will model their parents' smoking habits. Money wasted on smoking tobacco is enough to educate a number of promising youths. Each one of us was given a body designed for a limited time and that can be injured by smoking and use of other addictive drugs. Physicians are not acting responsibly unless they do everything possible to improve the health of everyone.

86–1948. Pierce, J.P.; Yong, C.S.; Dwyer, T., et al. **A Survey of Health Promotion Priorities in the Community.** *Community Health Studies* 9(3):263-269, 1985.

As part of the evaluation of the "Quit. For Life" smoking intervention, 5,713 people in Sydney and Melbourne prioritized seven health issues in order of community concern. Drunk driving appeared to be the major issue, with over 70 percent in Sydney and nearly 90 percent in Melbourne placing it in the top three issues. Smoking and stressful lifestyle were rated next most highly, followed by high blood pressure, lack of exercise, weight, and cholesterol in order of perceived importance. Teenagers gave highest priority to smoking. Although 29 percent of young males rated it as the most important issue, more men than women also rated it the least important. This was particularly marked for the 20- to 39- year age group. Somewhat more manual than managerial workers classified smoking as both most important and as least important. More respondents with a high socioeconomic status (SES) ranked smoking in the "Top 3" issues (66.1 percent) than did those in the lowest SES group (54.3 percent). The working age population of both sexes rated stress as important. Older age groups, particularly women, were more concerned with blood pressure. Younger people saw exercise as more important than did older people, but a large proportion of all age and sex groups ranked exercise as least important. (Auth. Abs. Mod.)

See also, **86–1890, 86–1891**

86–1949. Smith, A.E. **Fumes From a Non-Smoker. (Letter).** *Journal of the Florida Medical Association* 73(2):99-100, February 1986.

When the use of tobacco and its relationship to society's health is explored, the use of courts to attack what the U.S. Government and tobacco companies have failed to rectify is justified. The Government has not acted morally. It has not properly educated the public on the hazards of tobacco use, nor has it placed the proper emphasis on the danger of smoking. The tobacco companies have not acted morally or ethically. They have continued to advertise tobacco products in an attempt to habituate young Americans to a product known to be dangerous to health. If the Government and tobacco companies will not respond in a responsible manner that best serves the interest of the public good, then there is no other option but to vigorously apply pressure on all fronts, including the courtroom. Tobacco companies are as culpable as the Manville Corporation in the asbestosis issue and Robins in the Dalkon Shield situation. American business must act morally and ethically or pay the consequences. By attacking the tobacco companies in court, Americans will learn the extent of tobacco-induced diseases and deaths and the burden of tobacco on the American health system and its resources.

86–1950. White, L.; Whelan, E.M. **How Well Do American Magazines Cover the Health Hazards of Smoking? The 1986 Survey.** *ACSH News and Views* 7(3):7-11, May-June 1986.

The best coverage on smoking and health was found in those magazines that did not accept cigarette advertising, according to a 1986 survey of 18 magazines by the American Council on Science and Health. *Reader's Digest* led the group with best all around coverage of hazards of smoking, followed by *Prevention, Saturday Evening Post, Good Housekeeping*, and *Vogue*. Coverage of smoking hazards by the *Saturday Evening Post* has increased dramatically since 1983, when the magazine stopped taking cigarette advertising. *Glamour* had relatively good coverage of smoking and *McCall's* coverage had improved. Magazines with relatively poor coverage were *Cosmopolitan*, followed by *Redbook, Ladies' Home Journal, Ms., Self, Harper's Bazaar*, and *Mademoiselle*. Of news magazines, *Newsweek* scored high marks against poor coverage by *U.S. News and World Report* and *Time*. *50 Plus*, commended for its good reporting on the hazards of smoking in 1978 through 1980, was rated less highly in the most recent survey. It is suggested that banning cigarette advertising along with cigarette company-sponsored athletic and cultural promotions may free the media from the threat of economic reprisals for reporting the hazards of smoking.

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